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INDIAN LIBRARY ASSOCIATION
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DEPTH CLASSIFICATION
AND

REFERENCE SERVICE & REFERENCE MATERIAL

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Papers for Discussion at the Tenth
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Hyderabad, 1-4 June 1953



S. R. RANGANATHAN

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The Laws of Library Science

1. Books Are for Use
2. Every Reader His or Her Book
or
Books for All
3. Every Book Its Reader
4. Save the Time of the Reader
Cor : Save the Time of the Staff
5. A Library is a Growing Organism

ग्रन्थालयी सदासेवी पञ्चमूत्री परायणः ।

ग्रन्था अध्येतुमेते च सर्वेभ्यः स्वं स्वमाप्नुयुः ॥

अध्येतुः समयं शेषेदालयो नित्यमेव च ।

वद्विष्णुरेव चिन्मूर्तिः पञ्चमूत्री चिरं जयेत् ॥

PREFACE

The Executive Committee of the Indian Library Association decided that an attempt should be made to conserve the Conference-time for high level discussion. As a means to this end, it was decided that the papers offered for discussion at the Conference should be printed in advance, so that the Conference-time may not be taken up with the formal reading of the papers, but may be used fully for discussing the issues arising out of each paper. This method was tried at the Ninth All-India Library Conference held at Indore from 11 to 14 May 1951. It did produce the expected result. It is hoped that this method will prove equally efficient at the forthcoming Hyderabad Conference.

As agreed upon at an informal meeting of the Delhi Members of the Association, the Executive Committee suggested that the discussion at the Conference may be centered on a few related subjects rather than be dissipated. Accordingly papers were invited on the following two subjects: (1) Depth Classification, and (2) Reference Service and Reference Material. This recommendation of the informal meeting, it was clearly understood, did not at all take away the right of any member to offer a paper on any subject of his choice, falling within the perview of Library Science. However, apart from the 46 papers forming the two symposia, no other paper was received.

The first subject "Depth Classification" is now engaging world attention. The term itself owes its origin to India. The International Federation for Documentation has entrusted the pursuit of this subject to India. It is of immediate and practical importance to India. With the development of the newly established Indoc (=Indian National Science Documentation Centre), the necessity for Depth Classification will increase in importance. In the present period of renaissance,

India has to industrialize. This needs considerable research work. Apart from this, the bubbling new life in India is bringing to surface much research work in the fundamental sciences and subjects. It is imperative to minimize wastage in the original investigations in progress. This can be done only by a careful coordination of the work of all creative thinkers and teams. Such a coordination essentially depends on expeditious and exact communication in the region of Depth-ideas involved in research. Depth Classification is a necessary tool in communication. This shows the appropriateness and the timeliness of the choice, by the Indian Library Association, of the subject "Depth Classification" for discussion.

The second subject "Reference Service and Reference Material" is a natural corollary to the first. Depth Classification merely organizes the recorded materials in a helpful way. But one further step is necessary to make communication effective among the people at large. It is necessary even in the case of research scholars, to make research-work-in-team effective. This further step consists of dowering the reading material in a library with all the richness of human personality. This is Reference Service. In its turn, efficiency of Reference Service depends on the production of Reference Material. At the stage of research, the vital species of reference material needed consists of bibliographies, and abstracting periodicals. India has not yet begun to produce Reference Material; but we have every hope that the present intellectual upheaval in India will lead to its production. Again Reference Service has been slow in emerging in any part of the world. Here again, there is every hope that new India will develop it with great speed and efficiency.

It had long been my wish to examine this question of Reference Service and Reference Material from two angles—from this side of the counter and the other side. After all, Reference Service aims at serving readers, particularly research

P R E F A C E

scholars, in an acceptable and helpful way. Reference Librarians are really servers. How can servers know the faults in their service unless the consumers tell us their expectations ? With this in view, I invited specialists in different subjects to express their needs. But only the specialists in four subjects responded. I am satisfied with this amount of success in the first attempt. I do look forward to a fuller response on future occasions.

The thanks of the Editor are due to :

- (1) The six scientists for the trouble they have taken to write out their articles from the angle of the consumer ;
- (2) The members of the library profession for having worked in a team in a participating manner and covered the field in an economical way ;
- (3) Shri G.L. Gulati, the Convener for the Second Symposium ;
- (4) Shri K.D. Puranik for preparing the index and seeing the book through the press ;
- (5) Shri K. Mahalingam for preparing the press-copy of the book ;
- (6) the Reception Committee of the Tenth All-India Library Conference, Hyderabad, for making this publication possible ; and
- (7) the National Printing Works, Delhi, for the expeditious and excellent way in which the publication has been brought out.

C-6, Maurice Nagar,
Delhi-8

S.R. Ranganathan,
Editor.

9 April 1953.

SYMPOSIUM 1

DEPTH CLASSIFICATION

PAPER 1.1

APPROACH TO DEPTH CLASSIFICATION

S. R. Ranganathan

[Explains the why, what and how of Depth Classification needed for Documentation. Stresses the importance of separating work in the idea plane from that in the notational plane. Describes the essential points pursued in the several papers of the Symposium.]

0 Primary Purpose

In this Symposium the primary purpose of library classification is assumed to be:

- 1 Arranging records of knowledge and entries of them in bibliographies, in a more or less helpful sequence ;
- 2 Representing each record by an ordinal number—Call Number ;
- 3 Mechanising the maintenance of the sequence among them and among their entries, i.e. making it independent of reading each record every time when its place has to be found ;
- 4 Unerringly placing any new record next to the old ones on the same subject ;
- 5 Placing any new subject in a more or less helpful position among the old subjects related to it ; and
- 6 Providing for the Class Number of any new subject being determined alike by all disciplined classifiers without depending on the classificationist.

01 TRIPARTITE

Experience has shown that it is useful to make the Call Number tripartite. The first part—Class Number—represents

the subject matter (= the Soul of the record). The second part—Book Number—represents the language and form of exposition, certain other details corresponding to the linguistic and/or graphic embodiment (= Subtle Body) of the record and its year of publication. The third part—Collection Symbol—generally depends upon the physical condition (= Gross Body) of the record. It has been found helpful to sort out all the records in the first instance according to their physical condition or at any rate according to the place of their physical presence. The records, kept together, are said to form a Collection. Within a Collection, the records are first sorted out according to their subjects. Those, belonging to the same subject, are kept together. The sequence among them is mechanised by the Book Number. The subjects themselves are arranged in a more or less helpful sequence. The sequence among the subjects is mechanised by the Class Number.

1 Collection Number

Of the three steps in the arrangement of records, that of forming collections has the least relation to the thought-content of the records. Moreover the collections needed may have to be largely determined by local conditions. They are also liable to change from time to time. Collection Number is, therefore, usually left to the care of administration. Classificationists, and Classifiers have not generally devoted much thought to this part of the Call Number. The methodology associated with CC (= Colon Classification) has, however, emphasised the need for systematising Collection Numbers. Some account of them has been given both in *Library administration* by Ranganathan, 1935, (Madras Library Association, publication series, 5) and in *Library manual* by Ranganathan and Sivaraman, 1951, (Indian Library Association, English series, 3). A more objective treatment will also be found in *Optional facets* (6) by Ranganathan in the *Annals* of the Indian Library Association, 1, 1950, 161-164. In these, "Collection Symbol" had been named "Sequence Symbol."

2 Book Number

This Symposium does not consider Book Number either. But it may be stated here that other schemes of classification do not devote much attention to Book Number. On the other hand it has been independently developed. Moreover, generally speaking, any system of Book Number can be coupled with any scheme of classification.

3 Class Number

This Symposium is concerned mainly with Class Number, i.e. the number representing the subject of the record. It may be stated at this stage that the term 'Record' is used to denote any book or any article in a periodical or any part of a book, regarded for convenience, as a Unit to be entered in bibliographies (= documentation lists).

31 ANALYTICAL ENTRY

Library Classification was originally meant to be an aid to arrange the books of a library on the shelves in a more or less helpful sequence on the basis of subjects. Melvil Dewey started his DC (= Decimal Classification) with this objective. The LC (= Library of Congress Classification) restricted the objective even more. It was designed primarily to arrange the books of a particular library. In course of time the sequence of books on the shelves came to be reflected in a parallel sequence of entries in the catalogue. This came to be called the Classified or Systematic Part of the catalogue. This classified sequence of entries led to a new idea. The classified part of the catalogue could take, not only entries of whole books, but also entries of parts of books, and of articles in periodicals. Such an entry is called an Analytical Entry. The more minute the analysis, the narrower becomes the extension of a subject covered by an analytical entry. The great value of such an analytical entry to serious workers can be easily seen.

32 MACRO AND MICRO THOUGHT

We can, at this stage, introduce the term Macro Thought to denote a large unit of thought normally finding independent existence as a book. In contradistinction, a minute subject, expounded in an article in a periodical or picked out from a few pages or paragraphs of a book, may be denoted by the term Micro Thought. In course of time, analytical entries of Micro Thought released classification from the restriction imposed by arrangement of books on shelves. Today the purpose of Library Classification has been extended considerably, as shown in section 0.

4 Communication and Documentation

Library Classification may be regarded as an aid to communication. This view has been elaborately discussed in *Classification and communication*, 1951, of Ranganathan (Delhi University publications, library science series, 3). This view enriches library classification to a considerable extent. In the past, creation of new thought was in the hands of the exceptional few. Even among them there was no organised or conscious attempt to work in a co-ordinated manner. Each worked often independently of the other. This may be referred to as "Research in Parallel". Today, due to various ecological and sociological reasons, new thought is being created by large teams of people in a planned and co-ordinated manner. All the workers in a team need not be of the first order. In fact the capacity-scatter among the members of a team is very great. It includes, even people who are not much above the average. Work of this kind may be referred to as "Research in Series". Obviously, communication is of the very essence of Research in Series. Each member of a team may work on a tiny micro unit of thought. This may happen in several teams. All new micro thoughts should be promptly and unerringly communicated to everybody else concerned. Then only team work will be

possible. Economy requires it. Such a communication is of the very essence of Documentation.

41 APUPA PATTERN

The number of records embodying Micro Thought grows at a terrible rate. Their clutter soon obstructs communication. To obviate this, the new records and their entries should always be maintained in an "Apupa Pattern." In this pattern the primary subject of interest to a worker is called "Umbral Thought." Imagine a worker set in his umbral region either of bibliography or of the stack room or of the vertical files. Here all materials directly on his special subject will stand assembled. The materials, on either side of that position will have decreasing filiation to his umbral materials, as he recedes from the latter. The region on either side may be said to have the "Penumbral Thought" from his point of view at the moment. The penumbral region on either side ultimately shades into the "Alien Region" i.e. into thought with little filiation to his umbral thought. This should be true in relation to any subject, chosen as umbral. The arrangement of subjects should therefore be "Every-where-Apupa". This means that whatever subject is taken as umbral, relatively to it the arrangement of the whole universe of knowledge should be more or less Apupa. See *Classification and communication*, Sections 321—322

42 DEPTH CLASSIFICATION

The object of library classification is now taken to be the production of Every-where-Apupa Pattern among the totality of all thought—macro as well as micro—of the past, present and future, i.e. of an ever-expanding infinite universe of knowledge, now tending to become a Dynamic Continuum. This objective of library classification contains the original objective of shelf arrangement as a trivial particular case. A scheme of library classification capable of Everywhere-Apupa Pattern

even with micro units of thought is called Depth Classification. Depth Classification is essential to efficiency in Documentation.

43 REFERENCE SERVICE

To make communication exhaustive and expeditious, it is necessary not only to maintain all the records and their entries in an Everywhere-Apupa Pattern, but also to have a technique for working with the enquirer, and analysing and canalising his requirements. This is necessary to help him to enunciate the exact umbral and penumbral subjects in which he seeks materials, and then to start him at the correct point in the stack room or in the bibliography and put him along side his materials. It has been shown in *Classification and communication* and in *Classification, coding, and machinery for search*, 1950, by Ranganathan (UNESCO/NS/SL/3 dated 30 June 1950), that the technique of classification will also prove to be of immense service in this work provided the classification is properly designed. Thus an efficient scheme of Depth Classification is needed by both the factors in communication :—

- 1 Organising recorded thought ; and
- 2 Correlating the enquirer with all records directly or indirectly relevant to his work.

5 Analytico-Synthetic Classification

As shown in *Classification and communication*, an enumerative classification is unsuited to an ever-expanding infinite universe of knowledge. An analytico-synthetic classification alone can meet the situation. The beginnings of it are found in SC (= Subject classification). The UDC (= Universal Decimal Classification) carried it further. The CC is elaborating it more fully.

51 IDEA PLANE

An analytico-synthetic classification first analyses a subject into its Fundamental Constituent Ideas. This analysis is in

the Idea Plane. It leads to Facets and Phases. The fundamental or ultimate constituent belonging to any facet is called an Isolate Focus or simply an Isolate. The Main or Canonical Class determined by the analysis is called the Basic Focus of the subject. The basic focus and the isolates are then re-arranged in accordance with the Syntax of the Scheme of Classification.

52 NOTATIONAL PLANE

Each Isolate and Phase is then fitted with its appropriate Connecting Symbol. Thereafter, the basic foci and the isolates are translated into their respective ordinal numbers. The Class Number results. This work belongs to the Notational Plane. In this plane the class number is got by the synthesis of the constituent focal numbers.

53 DESIGNING

The designing of an analytico-synthetic scheme of classification is best done by similarly separating the work in the idea plane from that in the notational plane. This was realised only during the last few years. The teaching of advanced classification to the M.Lib. Sc. class disclosed the difficulties experienced by students by failure to distinguish the work in the two planes. The discussions in the Library Research Circle became clearer and more productive as a result of distinguishing them. The necessary terminology to implement this distinction was finalised in *Optional facets* (9) by Ranganathan in the *Annals of the Indian Library Association*, 2, 1952, 173-200.

54 SOURCE FOR ERRORS

The habit of distinguishing the work in the two planes has not yet firmly set in. Failure to act on this distinction is responsible for many errors. It often leads to a sense of frustration. It even occasionally lands librarians in despair. Then abandonment of classification altogether is seriously thought of. This is indeed pathetic.

55 CORRECTIVE

The analytico-synthetic approach, backed by distinction between work in idea, verbal and notational planes, acts as a corrective. The papers in this symposium seek to benefit by this corrective. Generally speaking, work in the idea plane should first be done. Then only one should descend to the notational plane.

56 MUTUAL HELP

Work done independently in the idea and the notational planes is able to have a mutual beneficial influence. Notation has to keep pace with formations in the idea plane. This makes a fuller exploitation of the notational set-up possible. This in its turn prevents hasty and improvident improvisation of new symbols. This satisfies the Law of Parsimony. More or less equally valid or helpful decisions indicated in the idea plane often cause confusion. Agreement among different thinkers about preferring one of these decisions becomes difficult. Nor is it easy even for one man to keep firmly to one preferred decision. The requirements in the notational plane often help to resolve this ambiguous situation.

57 NEW APPROACHES

The exploitation of this mutual influence of the work in the idea and the notational planes has led to many new Approaches to Depth Classification. One of the profound new concepts seized in these new approaches is that of Versatility of Notation. This has been explained in Section 577 of the *Optional facets* (9).

6 Classificationist's Apologia

While engaged in the Sunday meetings of the Library Research Circle of the Indian Library Association, the cynical part of my mind usually asks, "What is all this theoretical stuff? Is it because you have nothing else to do? Who, in the world, wants all this?" In anticipation, I had recorded an apologia

in *Elements of library classification* (1945) chap 10, Epilogue, to the Brother Librarian. Still I have been pursued by the feeling that that epilogue did not disclose sufficiently and concretely the root of the "theory" being firmly and truly planted in practical necessity. This disclosure is, however, now being abundantly provided. It has begun to appear after World War II, after the break-down of the communication of nascent micro thought began to disturb persons engaged in Research Work in Team (explained in paper 2.1 by S.R. Ranganathan), and after the beginning of an attempt at co-ordination of abstracting and documentation work, by Unesco.

61 PANGS OF SUFFERING

The following words in the Foreword to *International political science abstracts* 2, 1952 are typical. They express the pangs of disappointment and unfulfilled want. They remind me of the words of King Dasaratha addressed to his Privy Council about his "pangs of disappointment and unfulfilled want" in the perpetuation of his line of family through the birth of a son. See Valmiki *Ramayana*, Balakanda, chap 8—11.

"The replies we have received to the questionnaire which was enclosed with the fourth issue of 1951 raise an important problem—the classification of the published abstracts.

"As was explained in the notice published in Volume I, the difficulty of devising a satisfactory classification led us to print the abstracts by authors, alphabetically. We have been trying to find a more methodical system, but up to the present every method considered has proved, for one reason or another, unsatisfactory. The replies to our questionnaire did not reveal any agreement on this point.

During the second year we shall therefore continue to publish the abstracts according to the alphabetical

order adopted last year. We shall continue to seek a satisfactory system of classification, which could be started in 1953, and to this end feel we may count on the co-operation of our readers: every suggestion received will be carefully considered. In the meantime, we would draw attention to the usefulness of the analytical index printed on the first pages of each issue, drawn up so as to replace to a large extent a methodical classification." Beware Henry Evelyn Bliss!

These words carry the classificationist's apologia down to the earth.

62 RELIEF

I have no information regarding the persons replying to the "questionnaire". Did it include classificationists? Or did it include only experts in Political Science? If it is the latter, the statement "The replies.....did not reveal" need not be a surprise. The prescription made by the Privy Council of Dasaratha was karma (= action), yajna (= sacrifice). The prescription emphasised the need for bringing in an expert in the particular kind of action or sacrifice. The expert was Rishyasringa.

63 ACTION OF FID

In 1951, FID has prescribed a similar course to get relief in abstracting and documentation work. The expert needed is classificationist—an expert in the designing of classification. The designing of Depth Classification involves work by intuition and work by intellect. This has been shown in *Classification and international documentation* by S.R. Ranganathan, published in the *Review of documentation* of the FID, 14, 1947, 154—177. The course prescribed by FID in 1951 has been the creation or strengthening of a team of workers on the General Theory of Classification. It has also appointed a Rapporteur-General.

64 DELAY IN THE DAWN OF INDIA'S SENSITIVENESS

But the powers in India have not yet developed sensitiveness to the importance of the subject. India has therefore not yet found its way to provide for an Indian delegation to the annual meetings of the FID convened to consider this subject—to participate in the international *karma* and *yagna*, preparatory to the birth of the "satisfactory system of classification", yearned for by the Editors of the *International political science abstracts*.

65 LIBRARY RESEARCH CIRCLE AT DELHI

In the circumstances, preparation for the *yagna* at the international level is being made at the national level in India. It is made by a band of devoted young experts. This preparatory *yagna* at the national level is being continued in the congenial atmosphere of the campus of the University of Delhi. The *Abgila* of the Indian Library Association functions as the periodical medium for communication with the outside world.

66 ROLE OF THIS SYMPOSIUM

The role of this symposium is to review and consolidate the seeds (in theory) gathered during the last 18 months. In the earlier months, we felt like moving in a pathless jungle, in pitch-dark. It often recalled to mind the experience when some of my friends and myself were lost in the Regent's Park in one of the worst London fogs in November 1924. But during the last few months, some light has come. Some pathways have been laid. These new pathways in the Theory of Library Classification are mapped out in this symposium.

7 Lay-out of the Symposium

Many of the new approaches are explained in the earlier papers of this symposium. They may be labelled "Theoretical". The impact on the classification-catalogue relation is examined in some others. These papers too are mostly theoretical. The

facet-analysis of some of the subjects is revised in the later papers. These may be labelled "Applied".

71 Theoretical Papers

72-IDEA PLANE

During the last few years, work leading to Depth-Classification has precipitated a crop of new technical terms. It is increasing in number almost every month. Paper 1·2 of Mr. B.C. Vickery is a glossary of 320 of these new terms. It is a valuable work of reference.

The concepts "Facet" and "Train of Characteristics" have been till now used without a proper definition. These are now defined. This has led to a distinction between Group-Focus and Individual-Focus. This, in its turn, has led to a specialisation in the use of an Array as against a Facet. Paper 1·3 by Shri D.B. Krishna Rao is turned on this idea.

The clarification of the idea about Array has led to an objective examination and use of the several octaves in an Array. This forms the subject of Paper 1·4 by Shri S. Parthasarathy.

The analysis part of analytico-synthetic classification has called for some fundamental work. During the last few years experiments are being made in analysing a subject into facets answering the five Fundamental Categories—Time, Space, Energy, Matter and Personality. Paper 1·5 by Shri K.D. Puranik develops this analysis.

The application and the result of analysis into Fundamental Categories depends essentially on the use of different connecting symbols for them. Paper 1·6 by Shri S. Ramabhadran deals with this.

Work during the last two years has led us to realise that the Fundamental Categories can manifest themselves in succession in a subject in more than one Round. Paper 1·7 by Shri K.A. Isaac studies this question.

It has been further experienced that in any one Round the same Fundamental Category can occur more than once. Each such occurrence is said to land us in a different level. Paper 1.8 by Shri V.S. Moghe is on this subject.

The concept of Phase was originated about ten years ago. Since then varieties of phase-relation have been recognised. We seem to be on the eve of dealing with this problem more satisfactorily than hitherto. Paper 1.9 of Shri T.N. Koranne deals with this question.

73 NOTATIONAL PLANE

Mnemonics plays a great part in carrying the autonomy of a classifier to a great degree. Paper 1.10 by Shri P.N. Kaula reviews this problem.

A full exploitation of the use of Fundamental Categories, Octaves, Rounds, Levels, etc. appears to depend essentially on the use of a Mixed Notation. Paper 1.11 by Shri D.B. Krishna Rao seeks to bring out the potentialities of a Mixed Notation.

74 CLASSIFICATION-CATALOGUE RELATION

Since 1937, it has been recognised that classification can not do by itself everything necessary to help a reader to find his material. On the other hand, it is realised that there should be an economical symbiosis between classification and cataloguing. This has been secured by Chain Procedure. Paper 1.12 by Shri T.N. Koranne explains and illustrates this technique.

The fourth edition of *Colon classification* has transferred from Class Number to Book Number the duty of arranging records on any given subject according to the form of exposition. Paper 1.13 by Shri K.M. Ujlambker examines this suggestion and expands the Form Schedule for Book Number.

75 APPLIED PAPERS

It is now being realised that the traditional schedule of Common Sub-Divisions is a hotch-potch. In the fourth edition, CC has broken it into several schedules. Paper 1.14 by Shri S. Parthasarathy deals with the Anteriorising Common Sub-Divisions.

In Depth Classification we often come across specialised material relating to the several professions. No doubt 'Profession' should, therefore, be regarded as a Common Sub-Division. It requires a Facet Formula to reach co-extensiveness. Paper 1.15 by Shri K.D. Puranik is turned on this Facet Formula.

Similarly the Common Sub-Division 'Institution' also requires a Facet Formula. Paper 1.16 by Shri S. Parthasarathy deals with this question.

In the light of the theoretical results arrived at in the earlier papers, paper 1.17 by Shri R.S. Goyal examines and reconstructs the Schedule of Geographical Divisions.

In the DC tradition, there was no Schedule for the technique involved in the development of certain overall subjects that cannot be assigned to any of the traditional Main Classes. The UDC made a beginning by opening the "00 Numbers" to accommodate them. In its fourth edition, CC has taken that subject a little further. This set of divisions is called 'Prels'. Paper 1.18 of Dr. S.R. Ranganathan deals with them.

During the last four years the students of the M.Lib.Sc. class have been practising the preparation of classified abstracts in Library Science. This experience has enabled Shri S. Ramabhadran, Shri K.M. Ujlambker, Shri V.S. Moghe, and Shri K.A. Isaac to expand the Schedule for Library Science. This forms paper 1.19.

Shri D.B. Krishna Rao is now re-examining his expanded Schedule for Agriculture in the light of the theoretical results

obtained during the last two years. Paper 1.20 embodies some of his findings.

Shri R. S. Goyal devotes paper 1.21 to a difficulty in the formation of Author Numbers in Literature.

The Schedule in Labour is very mixed in the CC. It is equally so in DC and UDC. Paper 1.22 by Shri P.N. Kaula attempts to establish more satisfactory schedules for Labour Economics.

The Facet Formula for Taxation is undeveloped in CC. The Schedules in DC and UDC also are far from satisfactory. Paper 1.23 by Shri K.D. Puranik starts the tidying up of the Classification Schedule for Taxation.

Most of the isolates in the arrays of "X 72 Taxation" are differentiating isolates. This means each of them requires an independent study of its facet analysis. The Facet-Analysis of Income Tax is attempted, as a sample, in paper 1.24 by Shri C.S. Krishnamurthy.

Law is one of the weakest spots in DC and UDC. The CC has a more satisfactory facet-analysis of the subject. But there are many gaps in the Schedules. Some of the Foci need to be transferred from one schedule to another to bring the scheme in conformity with modern developments in law. Paper 1.25 by Shri E.D. Jayaram is concerned with this question.

The discussions in the Library Research Circle of the Indian Library Association have disclosed the dangers of using the ordinary language as the medium or tool-language or meta-language to investigate and discuss a classificatory language. It is being realised that the necessary precision and brevity can be secured only, if the tool-language or meta-language is either solely or largely symbolic. Paper 1.26 by Dr. S.R. Ranganathan deals with this. It also summarises the results obtained till now.

PAPER 1·2

Glossary of Current Terminology B.C. Vickery

[Gives a glossary of the technical terms currently in use in the development of thought on classification. The glossary is brought up to the hour, as it were.]

The proliferation of new terms in a rapidly developing theoretical subject is a common feature in the history of human thought. Classification and subject-indexing are today in such a state of development, and it becomes necessary to attempt some survey of the field so that workers in it may remain mutually intelligible.

The following glossary has been compiled from a survey of the works of Bliss, Cordonnier, Farradane, Ranganathan and Vickery, using the glossary by Harrod (1938) as a source for established terms, and with occasional reference to other works. 320 terms are defined. More of these are recent. This is a measure of the active work now in progress in the field of Library Classification.

Words defined elsewhere in the glossary are in italics.

accident :	a quality which is incidental to a <i>class</i> .
action :	the <i>category</i> or facet of terms expressing interaction between things (Vickery)
addition :	the relation symbolised in UDC by / or + (Dayvis)
agency :	the means whereby an <i>operation</i> is effected (Vickery)
agglutinate :	<i>symbol</i> , two or more parts of which have a constant meaning, but some or all of the parts cannot be used separately (Vickery)
alien :	a <i>subject</i> totally irrelevant to the subject sought (Ranganathan)
allocation :	placing one subject in context with, or next to another subject (Bliss)
alphabetical device :	the use of the initial-letter (<i>s</i>) of the name of an <i>entity</i> for further <i>division</i> of a <i>class</i>
index :	a verbal index in which the <i>headings</i> are arranged alphabetically

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alphabetico-classed sequence:	the sequence of a <i>verbal</i> index in which the alphabetically arranged <i>verbal</i> headings are <i>subdivided</i>
alternative location:	the <i>allocation</i> of subjects to more than one context in a <i>classification</i> (Bliss)
amalgamate:	<i>symbol</i> , in which the meaning of some of the parts is not constant but is dependent upon the pattern of the whole (Vickery)
amplified class:	a <i>class</i> expounded according to a special system of thought, other than the currently used one; notationally, a <i>main class digit</i> to which a <i>chronological</i> number has been added (Ranganathan)
analet:	a linear arrangement of <i>isolates</i> , linked by <i>operators</i> , which represents a specific subject (Farradane). Any such aggregate of <i>terms</i> (Vickery)
analytical index:	an index which records the subjects recorded in the documents indexed
analytico-synthetic classification:	a <i>classification</i> which represents a subject by analysing it into its fundamental constituent elements, and synthesizing a class <i>symbol</i> for the subject out of these elements linked by appropriate <i>connecting symbols</i> (Ranganathan)
ancillary subject:	one which is contributory to, or helpful to, another subject (Bliss)
anterior subdivision:	<i>subdivision</i> of a subject which is placed before the subject in a <i>classified sequence</i> (Bliss)
anteriorizing symbol:	affixed <i>symbol</i> which has the effect of bringing the <i>term</i> symbolized anterior to a term without such an affix (Ranganathan)
appurtenance:	a relation holding between two <i>isolates</i> which are not <i>distinct</i> but in <i>fixed</i> relation one to another (Farradane)
apupa:	an arrangement in which subjects are in the sequence: <i>alien, penumbral, umbral, penumbral alien. Helpful sequence</i> (Ranganathan)
area:	the area of a <i>notation</i> in any given <i>expansion</i> is the maximum number of separate <i>classes</i> it can accommodate at that level (Bliss)
arrangement:	an enumeration of subjects according to some specific purpose (Kaiser). The physical disposal of documents into an arranged sequence (Cordonnier)

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array:	the set of mutually <i>exclusive co-ordinate</i> sub-classes totally <i>exhaustive</i> of a <i>class</i> , derived by its <i>division</i> according to some one <i>characteristic</i> (Ranganathan)
	a group of co-ordinated classes.
aspect:	a relation between <i>phases</i> (Ranganathan)
assemblage:	the formation of a <i>complex</i> or <i>multi-phased focus</i> by coupling two or more <i>simple</i> or <i>compound foci</i> (Ranganathan)
association:	a relation between two <i>isolates</i> which is fixed and concurrent, "especially suitable for expressing <i>aesthetic</i> , <i>moral</i> or other <i>abstract relations</i> " (Farradane)
assortment:	the process of <i>division</i> of a <i>universe</i> into groups and <i>arrangement</i> of the groups into a definite <i>sequence</i> (Ranganathan)
assumed term:	term which cannot be defined, but must be drawn direct from experience in constructing a <i>meta-language</i> . Ranganathan uses assumed terms such as <i>existent</i> , <i>separate</i> , <i>separable</i> , <i>distinguishable</i> , <i>finite</i> , <i>infinite</i> , <i>attribute</i> , <i>pervasion</i> , <i>measure</i> , <i>time</i> , <i>space</i> , <i>quality</i> , <i>action</i> , <i>matter</i> , <i>object</i> , <i>whole</i>
asyndetic:	not <i>syndetic</i> (Cutter)
attribute:	any <i>property</i> , <i>quality</i> or <i>action</i> of any <i>entity</i> (Ranganathan)
auto-biased focus:	a <i>focus</i> which is a <i>scheduled division</i> of a <i>facet</i> further divided by another <i>scheduled division</i> of itself (Ranganathan)
auxiliary conjunction:	a <i>conjunction</i> which has no semantic content (Ranganathan)
	See also <i>empty</i> , <i>signpost</i> , <i>fence</i>
—schedule:	<i>schedules</i> which assist <i>composite classification</i> (Bliss)
—syndesis:	the accessory apparatus—e.g. <i>cross-reference</i> —which is used to supplement <i>indexing sequences</i> so as to reveal other relations (Vickery)
base:	the maximum number of <i>classes</i> in any <i>array</i> of a <i>classification</i> (Cordonnier).
	The total number of <i>digits</i> in a <i>notation</i> (Ranganathan)
basic focus:	a <i>main</i> or <i>canonical</i> or <i>amplified main class</i> (Ranganathan)
bias:	a <i>relation</i> between <i>phases</i> , the <i>primary phase</i> being studied from the point of view of the <i>secondary</i> or <i>biasing phase</i> (Ranganathan)

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bivalent symbolism:	Symbols so designed that each <i>digit</i> reveals both its <i>rank</i> and <i>order</i> (Cordonnier)
canalization:	analysis of a subject so as to put it into a form suitable for representation by an <i>analytico-synthetic classification</i> (Ranganathan)
canon:	a principle derived from the normative principles of a subject, for application within one of its sub-divisions
canonical class:	a traditional subclass of a <i>main class</i> (Ranganathan)
canonical sequence	not derived on the basis of any definite characteristic; a traditional arrangement of subjects, for which no underlying principle is discoverable (Ranganathan)
capacity:	<p>the capacity of a <i>notation</i> is the number of <i>classes</i> available for its contents (i.e. the matter to be classified).</p> <p>The <i>maximum</i> capacity is what the notation mathematically allows; the <i>feasible</i> capacity is less than this by reason of certain omitted <i>digits</i>, objectionable combinations, etc.; the <i>requisite</i> capacity is still less, since for many available class <i>terms</i> there will be no content. <i>Composite</i> classification, by combining terms, provides a <i>super-capacity</i> (Bliss)</p> <p>If the maximum number of classes in any array is D, then the number of terms with n digits is $S=D^n$; the maximum capacity of all class terms is $C=(D^{n+1}-D)/(D-1)$ (Ranganathan)</p> <p>Using <i>isolates</i> instead of <i>flexional</i> class terms, then with D isolates in groups of n, $S=D^n/n^n$ (Vickery)</p>
capital octave:	<i>last octave</i> (Ranganathan)
categorical tabl	<i>schedule</i> of terms occurring more than once, for forms, standpoints, qualifications, etc. in Brown's Subject Classification
category:	a fundamental form or class of concept into which items of knowledge can be grouped
causation:	a relation holding between two <i>isolates</i> which are <i>distinct</i> and in <i>fixed</i> relation one to another (Farradane)
chain:	a hierarchy of <i>modulated</i> subclasses of decreasing <i>extension</i> and increasing <i>intension</i> derived by successive <i>division</i> leading to a <i>compound</i> or <i>complex</i> class in general or <i>denudation</i> within a facet of any <i>class</i> in particular (Ranganathan)

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	A sequence of <i>subordinated classes</i>
chain procedure:	the standardized procedure whereby the successive <i>terms</i> in a <i>chain of classes</i> are transformed into <i>headings</i> for an <i>alphabetical index</i> (Ranganathan) More generally, the representation of a chain of <i>flexional terms</i> by a system of <i>isolates</i> (Vickery)
characteristic:	an attribute by which concepts are assembled or <i>divided in classification</i>
chronological device:	the further <i>division</i> of a <i>class</i> by <i>terms</i> expressing date or time
sequence:	<i>arrangement</i> according to time or other basis
cipher:	the <i>symbols</i> used by Dyson and others to represent chemical compounds
class:	any <i>term</i> in a <i>classified sequence</i> ; a group of entities sharing the same <i>characteristic</i>
—, to:	to arrange subjects according to an existing scheme of <i>classification</i> (Kaiser); to <i>classify</i> , to assign, or refer, a document to a <i>class</i> in a scheme of <i>classification</i> (Bliss)
—number:	an ordinal number representing the position of a <i>class</i> in a scheme of <i>classification</i> (Ranganathan)
classic:	a book that stimulates other books and literature on itself (Ranganathan)
classification:	an orderly <i>arrangement</i> of terms developed by <i>logical division</i> of a subject by means of a <i>train of characteristics</i> . Extended to mean any form of systematically arranged subject matter Further extended to mean an artificial language of ordinal numbers designed to mechanize this arrangement (Ranganathan)
classificationist:	one who designs a scheme of <i>classification</i> (Ranganathan)
classified sequence	the sequence resulting from the scheme of <i>classification</i>
classify, to:	to arrange subjects according to an existing scheme of <i>classification</i> (Ranganathan), to <i>class</i>
class-mate:	another <i>term</i> in the same <i>array</i> ; another <i>member</i> of the same <i>class</i>
class-membership relation:	the relation of a <i>class</i> to its <i>members</i>
closed:	an <i>array</i> which cannot be extended at either end is said to be closed (Ranganathan) If two or more <i>chains of classes</i> , forming a <i>composite</i>

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	<i>rambeau</i> , jointly give rise to a <i>subordinate</i> chain, the <i>rambeau</i> is said to be closed (Cordonnier)
code:	a symbolic representation of subjects in which similar <i>symbols</i> do not necessarily have similar meanings
code symbol:	an <i>isolating</i> or <i>non-flexional symbol</i> , or a compound aggregate of such symbols (Farradane)
coextensive:	a <i>classification term</i> is said to be coextensive with the <i>subject</i> of the document so classed, if their <i>connotations</i> are identical
cognate:	when the same digit is used for <i>sharpening</i> a <i>focus</i> more than once, these foci are assigned to different <i>actives</i> in the <i>array</i> and are called cognate foci (Ranganathan)
collateral:	two <i>classes</i> of the same <i>order</i> , but are not <i>coordinate</i> , are collateral: also two <i>arrays</i> of the same order (Ranganathan)
collection number:	a <i>symbol</i> denoting any special characteristic (size, physical form, or class of users, etc.) of a group of books, which because of this characteristic must be separately located (Ranganathan)
collocation:	placing closely related subjects in close proximity (Bliss)
colon:	a device used in the UDC to link related <i>class terms</i> ; in the CC (up to edn 3) to separate successive <i>foci</i> ; and in the CC (edn 4) to introduce the <i>energy foci</i>
common facet:	a <i>facet</i> which can occur in any of several <i>classes</i> of many <i>main classes</i> (Ranganathan)
comparison:	a relation between phases (Ranganathan) A relation between <i>isolates</i> which are concurrent and in temporary association (Farradane)
complete chain:	a <i>loose primary chain</i> (Ranganathan)
complex:	a <i>focus</i> is complex if it comprises two or more <i>phases</i> (Ranganathan)
component:	a <i>test</i> which cannot be separated from its whole without loss of identity (Vickery)
composite classification:	one in which specific subjects are represented by coupling <i>elementary terms</i>
compound:	a <i>focus</i> is compound if it comprises a <i>basic focus</i> and one or more <i>isolates</i> (Ranganathan)

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- concealed classification : the *classification order* which, though not apparent, is the basis of *cross reference* and *subdivision* in *syndetic verbal indexes* (Pollard & Bradford)
- concomitant : two *characteristics* which divide up a subject in exactly the same way are said to be concomitant (Ranganathan)
- concurrence : a relation holding between two *isolates* which are concurrent and non-temporally related (Farradane)
- concrete : used in the *Kaiser index* to denote the main *verbal heading*—a thing or form of energy
- concreteness, increasing : one of the ways of arranging classes (Ranganathan)
- condensation : the representation of a series of digits in a *class term* by a single digit (example in *cordonnier*).
- conjunct consonant : a suggested method of *condensation* (Ranganathan)
- conjunction : a *symbol* in a *classification term* linking two *substantives* (Ranganathan)
- connecting symbol : a *symbol* in a *classification term* coupling two *substantives* (Ranganathan)
- connective index : an index which links related *headings*. *Syndetic index*.
- connotation : all the *characteristics* (in their respective measures of incidence) comprised in a *class term*
- consensus : the accepted, historically evolved, systematization of knowledge embodied in scientific and educational literature (Bliss)
- consistency : the use in *logical division* of *characteristics* in a fixed sequence; the arrangement of *coordinate classes* in a fixed sequence (Ranganathan)
the use of only one characteristic to derive any given *array* from its parent class (Groeneveld);
the use of successive characteristics in logical division, such that each is a modification, a mode of existence of the earlier one (Broadfield)
- constant mnemonics : components of a *class term* which bear the same meaning wherever they occur in the *classification* (Bliss)
- constituent : a *part* which can be separated from its whole without loss of identity (Vickery)
i. e. (=Not-whole) neither having all the attributes of the whole, nor distinctively associated with nor uniquely specific to the whole (Ranganathan)
- term : the elementary *substantive* by combination of

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	which a subject is represented in <i>composite classification</i> (Ranganathan)
content :	the content of a <i>class</i> is the subject matter it comprises (Bliss)
continuous universe :	<i>universe</i> of separately cognizable but not separated <i>existents</i> (Ranganathan)
coordinate classes :	of the same <i>order</i> of division (Bliss) ; belonging to the same <i>array</i> (Ranganathan)
—indexing :	the use of <i>composite</i> terms (Taube)
coordination :	the <i>linking</i> of <i>terms</i> in the UDC (Donker Duyvis)
cross classification :	the formation of an <i>array</i> by the use of more than one <i>characteristic</i>
reference :	a <i>heading</i> in an <i>index</i> which directs the searcher to another heading
cyclic rameau :	closed rameau (Cordonnier)
decimal fraction notation :	a <i>notation</i> in which the place values of the <i>digits</i> remain intact when an extra digit is added at the end of the <i>term</i>
defined term :	a term derived from an <i>assumed</i> term by the operation of <i>logical constants</i> (Ranganathan)
denotation :	the sum-total of <i>entities</i> to which a <i>term</i> applies
denudation :	the formation of a subclass by the addition of a <i>differentia</i> to the parent <i>class</i> (Ranganathan)
dependent facet :	a facet which can not manifest itself unless a focus in the earlier facet manifests itself (Ranganathan)
focus :	<i>subordinate focus</i> in a <i>facet</i> (Ranganathan)
descriptor :	an <i>elementary term</i> (Moore)
dictionary index :	an <i>alphabetical index</i> in which the headings follow one another without subdivision (Vickery)
difference, differentia :	<i>characteristic</i> which differentiates a <i>species</i> from its <i>genus</i>
differential facets :	in some part of a <i>classification</i> , two or more <i>coordinate classes</i> of a given <i>array</i> in the first <i>facet</i> may require different <i>schedules</i> in a second facet (Ranganathan)
differentiation :	<i>logical division</i> (Bliss)
diffuse facet :	when the subject matter of a document is diffusely spread over the <i>classes</i> in an <i>array</i> , that <i>facet</i> is <i>diffuse</i> (Ranganathan)
digit :	any single <i>symbolic mark</i> that occurs in a class term
dimensional :	a relation holding between two <i>isolates</i> which are not <i>distinct</i> and are in temporary association (Farradane)

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discrete universe :	<i>universe</i> of separate <i>existents</i> (Ranganathan)
disjunctive incidence :	when a <i>class</i> figures in a subject, not holistically but as an unintegrated disjointed aggregate of subclasses (Ranganathan)
dissection :	the formation of an <i>array</i> of subclasses by <i>division</i> of a <i>class</i> (Ranganathan)
distinct :	a relation between <i>isolates</i> (Farradane)
division :	may be <i>logical</i> , <i>metaphysical</i> or <i>physical</i> (Joseph)
effect :	an interaction between <i>entities</i> in which they retain their individuality (Vickery)
elementary proposition :	in logic, a proposition which refers to particular not general, subjects. Thus simple elementary propositions include the subjectless (it rains), <i>subject-predicate</i> (this paper is white), <i>class-membership</i> (Toby is a dog) and relational (Brutus killed Caesar, etc.)
—term :	an individual <i>term</i> which is combined in a <i>composite</i> classification to form a subject. Various known as <i>semantic element</i> , <i>descriptor</i> , <i>isolate</i> , etc.
elliptical :	the title of a document is elliptical if certain <i>facets</i> of the subject it treats are not explicitly stated (Ranganathan)
empty :	any symbol in a <i>classification term</i> , which does not itself contribute to the substance of the meaning of the subject, is semantically empty (Vickery)
energy :	one of the <i>fundamental categories</i> of <i>substantives</i> (Ranganathan)
entity :	any <i>existent</i> , concrete or conceptual (Ranganathan)
enumerate :	to juxtapose terms arbitrarily (Kaiser) to set out <i>classes</i> or <i>isolates</i> in a preferred helpful sequence (Ranganathan)
enumerative classification :	a classification which enumerates in its schedules all possible subjects (Ranganathan)
equivalence :	a relation between <i>isolates</i> which are not <i>distinct</i> and not temporally related (Farradane)
evolutionary sequence :	one of the ways of arranging <i>classes</i> or <i>isolates</i> in an <i>array</i> (Ranganathan)
exclusiveness :	the principle that it should not be possible to <i>class</i> a specific subject in more than one term in an <i>array</i> (Ranganathan)
exhaustive division :	<i>logical division</i> as minute as possible in order to accommodate in a <i>classification</i> subjects of the

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	narrowest <i>extension</i> , and to ensure that the <i>terms</i> in an <i>array</i> should accommodate all possible species of the parent <i>genus</i>
existent:	an object or an attribute (Ranganathan)
expansion:	the progressive subdivision of <i>classes</i> in a <i>classification</i>
expressive:	<i>classification</i> is expressive when it represents a given subject by a <i>symbol</i> revealing its relevant characteristics in their appropriate mutual relation, rather than by a purely denotative symbol; cf. <i>extensional</i> (Ranganathan)
extension:	all the <i>entities</i> to which a given <i>term</i> in a <i>classification</i> may be applied.
—, decreasing:	one of the ways of arranging <i>classes</i> in a <i>chain</i> (Ranganathan)
extensional:	<i>classification</i> is extensional when it represents a subject by a simple denotative <i>symbol</i> , rather than by a symbol expressing the relations of its relevant characteristics; cf. <i>expressive</i> (Ranganathan)
extrapolation:	a <i>notational</i> device whereby <i>terms</i> can be added to one end of an <i>array</i> (Farradane)
facet:	the totality of the sub-classes of a <i>basic-class</i> derived by the use of a single <i>train</i> of <i>characteristic</i> (Ranganathan)
—analysis:	the enumeration of the possible <i>trains</i> of <i>characteristics</i> by which a <i>main class</i> can be divided (Ranganathan)
—formula:	the <i>notational</i> representation of the <i>facets</i> of a <i>basic class</i> and the order in which they are to be used in constructing a <i>class-number</i> (Ranganathan)
factor:	a <i>digit</i> in <i>notation</i> (Bliss)
feasible:	see <i>capacity</i> (Bliss)
featuring:	in a <i>classified</i> catalogue, entering against each <i>class number</i> a translation, in a natural language, of the <i>digit</i> of greatest <i>intension</i> in the number
fence:	a semantically <i>empty symbol</i> in a <i>class number</i> , separating consecutive <i>facets</i> (Vickery)
filial arrangement:	<i>classified order</i> (Ranganathan)
first octave:	any <i>array</i> in the CC whose <i>isolate number</i> begin with 1 to 8. The second octave is an array beginning 91 to 98, the third 991 to 998, etc (Ranganathan)

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first octaves :	the totality of octaves in which the first significant digit of an isolate number is an Arabic numeral other than 9 (Ranganathan)
fixed relation :	a permanent association of isolates (Farradane)
flexibility :	the quality of a classificatory notation which permits the insertion of new terms (Sayers) and which permits mobility of its semantic elements (Vickery). Cf. rigidity
flexional symbols :	classification symbols in which each component digit has a meaning (Vickery)
focal number :	complex or compound or basic class number or isolate number (Ranganathan)
focus :	a class or isolate in the idea plane, a subject or an isolate in the verbal plane, and a class number or isolate number in the notational plane, (Ranganathan)
functional affix :	an affix indicating the " part of speech " of each term in a <i>rameau</i> (Coordonnier)
fundamental category :	one of the categories of substantives: time, space, energy, matter and personality (Ranganathan) time, space, property, action, operation, part, substance, personality, (Vickery)
generic relation :	the relation of species and genus
genus :	a class which may be differentiated into species
geographical device :	the further division of a class by terms expressing place or physical features
gradation by speciality :	the arrangement of classes in an array by decreasing generality (Bliss)
group relation :	the relation of an entity to the group or class of which it is a member
—term :	a term in a classification which has subsumed under it a number of concrete entities and not species ; a group is an aggregate of individuals (Bliss)
heading :	any symbol in an index which represents a subject and for which the user seeks
helpful sequence :	an arrangement of headings designed to reveal relations existing between them
higher collectives :	terms which denote either a group of which the given term is a member, or a genus of which it is a species (Vickery)
hospitality :	the quality of a notation which permits insertion of new terms—flexibility
—in array :	the quality of a notation which permits

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	<i>extrapolation and interpolation in an array</i> (Ranganathan)
—in chain :	the same in a <i>chain</i> (Ranganathan)
ideograph :	a structural set of <i>marks</i> symbolizing a subject
ideographic heading :	an index <i>heading</i> which consists of <i>symbols</i> other than words (Holmstrom)
immediate universe :	the parent <i>class</i> from which a given class has been differentiated with the aid of a single characteristic (Ranganathan)
indexing sequence :	the sequence of the <i>headings</i> in an index
indicator digit :	<i>symbol</i> in a <i>class number</i> which indicates the nature of the <i>category</i> to which the following <i>facet</i> belongs (Palmer and Wells)
inductive notation :	the representation of each <i>isolate</i> by an arbitrary <i>symbol</i> (Farradane)
infima species :	the <i>species</i> of smallest <i>extension</i> and greatest <i>intension</i> in a <i>chain of classes</i>
influence relation :	a relationship between <i>phases</i> (Ranganathan)
institution :	isolated by Ranganathan in his "after-space common personality facet"
integral incidence :	when a <i>class</i> figures as an integrated whole in a subject (Ranganathan) cf. disjunctive
intension :	the attributes implied by a <i>term</i> in a scheme of classification
inter-calation :	interposition of a homological <i>chain</i> in a chain appertaining to another <i>category</i> so that it is <i>subordinated</i> to the first part of the other chain and <i>super-ordinated</i> to the <i>second part</i> (Duyvis)
internal notation :	<i>notation</i> indicating the sequence of books within a <i>class</i> —i.e. by author mark, book-number, etc. (Bliss)
interpolation :	a <i>notational device</i> whereby <i>terms</i> can be inserted at any point in an <i>array</i> (Farradane)
inversion :	the rearrangement of the words in a verbal <i>heading</i> so that the formerly later part of the heading is brought to the front and is thus <i>prepotent</i> in determining the location of the heading in the <i>indexing sequence</i>
isolate :	any object, process, abstract term or <i>class</i> of any of these (Farradane) ; any <i>notational symbol</i> the component <i>digits</i> of which are <i>marks</i> devoid of meaning (Vickery) generic term to denote <i>isolate idea</i> , <i>isolate term</i> or <i>isolate number</i> (Ranganathan)

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—idea :	a unit of thought which can not be a <i>class</i> or denote a subject by itself, but yields a <i>class</i> when attached to a <i>basic class</i> (Ranganathan)
—number :	a number representing an <i>isolate idea</i> ; it occurs in a <i>facet</i> (Ranganathan)
—term :	the word or words in a natural language denoting an <i>isolate idea</i> ; it occurs in a <i>facet</i> (Ranganathan)
lamination :	the formation of a compound focus by combination of one or more <i>isolates</i> with a <i>basic class</i>
last link :	the <i>infima species</i> (Ranganathan)
last octave :	any <i>array</i> in CC, whose <i>isolate numbers</i> begin with a capital letter (Ranganathan)
last octaves :	the totality of octaves in which the first <i>significant</i> digit of an <i>isolate number</i> is a capital letter
level :	in each <i>round</i> , there may occur more than one manifestation of a given <i>fundamental category</i> . Each of these manifestations is a <i>level</i> (Ranganathan) a <i>facet</i> formed when a W [P] is broken into <i>organs</i> in the process of classification (Ranganathan)
—of organisation :	a group of <i>entities</i> at the same level of complexity
line :	<i>chain</i> (Cordonnier)
link :	any relation between <i>headings</i> (Vickery) ; a <i>class</i> or a <i>isolate</i> in a <i>chain</i> (Ranganathan)
logical analysis ; logical division :	the differentiation of a <i>genus</i> into <i>species</i>
logical constant :	a kind of symbolic apparatus used in constructing a <i>meta-language</i>
loose chain :	a <i>chain</i> the <i>last link</i> of which is a <i>unitary class</i> (Ranganathan)
lower-case octave :	<i>pre-first octave</i> (Ranganathan)
lower link reference :	reference from one <i>heading</i> to a more general one (Ranganathan)
lower specifics :	<i>terms</i> which denote <i>members</i> of a <i>group</i> , or <i>species</i> of a <i>genus</i> (Vickery)
main class :	a fairly homogeneous region of the universe of knowledge given by a scheme of <i>classification</i> as a focus in its first <i>order array</i> of the <i>universe</i> of knowledge
mark :	a <i>class-number</i> (Bliss) ; a structural element in an ideography (Vickery)
maximum :	see <i>capacity</i> (Bliss)

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measure:	the number of units or any other specification in which a <i>property</i> is incident (Vickery)
mechanisation:	devising a classificatory <i>notation</i> so that the <i>indexing sequence</i> of its <i>symbols</i> is the preferred <i>helpful sequence</i> in the idea plane (Ranganathan)
meta-language:	an artificial language to make communication exact in the development of a language-study; the latter is <i>object language</i> ; this itself may be natural or artificial (Ranganathan)
metaphysical analysis:	of an <i>entity</i> into its <i>attributes</i>
modified bias:	the introduction of a <i>bias number</i> within a <i>facet</i> (Ranganathan)
modifier:	an <i>agglutinative flexion</i> which is used to modify the meaning of the <i>symbol</i> to which it is affixed (Vickery)
modulate:	to form a <i>chain of classes</i> by appropriately small steps in <i>division</i> of resolving power
multifocal:	a <i>facet</i> of a subject is multifocal when several, but not all the <i>foci</i> in an <i>array</i> of it manifest themselves in the subject represented (Ranganathan). See also <i>polytopical</i>
nomenclature:	a consistent system of names for <i>elementary terms</i> in a scheme of classification or in any discipline
non-equivalence:	a relation between <i>isolates</i> which are <i>distinct</i> but not temporally associated (Farradane)
normal rameau:	a linear arrangement of a <i>rameau</i> , such that branches are cited in the <i>rank</i> order of the first <i>digit</i> in the branch (Cordonnier)
notation:	an artificial language of <i>symbols</i> other than words of a natural language so devised that the symbols can be arranged according to their ordinal values in a unique sequence by means of conventional rules, this sequence helpfully revealing relationships between the subjects symbolized
notational indexing:	indexing by the use of <i>symbols</i> other than words of a natural language as <i>headings</i>
—symbol:	any <i>symbol</i> , other than a word of a natural language which is used for an index <i>heading</i>
numeral octaves:	beginning with neither lower-case nor capital letter (Ranganathan)
object language:	the language forming the object of study and/or development (Ranganathan)
octave:	a zone or region of an <i>array</i> marked off from others (Ranganathan)

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—principle:	the use of the figure 9, in a decimal <i>array</i> , not to individualize a <i>class</i> , but to introduce a further octave of classes (Ranganathan)
octavizing digit:	<i>digit</i> used to mark off an <i>octave</i> or to form a succeeding <i>octave</i> in an <i>array</i> (Ranganathan)
open:	an <i>array of classes</i> , which admits of extrapolation at one end, is said to be open (Ranganathan) If two or more <i>chains of classes</i> remain independent when joined, they are said to form an open <i>rameau</i> (Cordonnier)
operation:	mental or experimental mode of manipulating phenomena (Vickery), isolated by Ranganathan is his "pre-first octave common energy facet"
operator:	a relational term between <i>isolates</i> (Farradane)
optimal ramification:	that <i>base</i> which makes the number of steps from the <i>sumum genus</i> to a particular species a minimum (Cordonnier) A modification of this, to mean the base which makes the number of <i>digits</i> a minimum (Vickery)
optional facet:	the use of distinctive <i>connecting symbols indicators</i> to introduce the various <i>categories of facet</i> , so that all facets are not made necessarily <i>dependent</i> (Ranganathan)
order:	the order of a <i>class</i> or an <i>isolate</i> is the number of successive <i>characteristics</i> used to derive it from its original universe (Ranganathan)
organ:	a <i>part</i> which cannot be separated from its whole without loss of identity (Vickery) A non-whole not having all the attributes of the "whole but distinctively associated with, or uniquely specific to the whole (Ranganathan)
parallel classification:	<i>classification</i> , by the same <i>scheme</i> , of material which is first divided by size, character, etc. (Harrod). Symbolically represented by <i>collection number</i> (Ranganathan)
part:	one of the <i>categories</i> (Vickery) Generic name for <i>portion, organ</i> and <i>constituent</i> (Ranganathan)
partial comprehension:	describes a subject which includes more than one but not all of the <i>classes</i> or <i>isolates</i> in an <i>array</i> (Ranganathan)

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particle of relation :	a conjunction expressing a relationship (Vickery)
penultimate octave :	a secondary <i>phase</i> linked to a primary by means of the <i>symbol</i> :9 (Ranganathan)
penumbral :	a <i>heading</i> which is partly relevant to the subject sought (Ranganathan)
personality :	a <i>category of substantives</i> which are unanalysable and have to be handled gently and as a whole (Ranganathan)
	Entity whose parts cannot be separated without loss of identity (Vickery)
phase :	that constituent of a subject which is derived wholly from a single <i>main class</i> (Ranganathan)
phonetic heading :	an index <i>heading</i> which consists of words (Holmstrom)
physical analysis :	into <i>parts</i> (Joseph)
polytopical :	treating of several subjects (Cutter)
	See also <i>multifocal</i>
polyvalent vertical notation :	a <i>notation</i> in which each digit represents one of the <i>characteristics of division</i> (Cordonnier)
portion :	whole in a smaller measure (Ranganathan)
posterior common subdivision :	common subdivision that does not require an <i>anteriorizing symbol</i> (Ranganathan)
pre-first octave :	any array in CC whose <i>isolate numbers</i> begin with a lower-case letter (Ranganathan)
pre-potent :	that <i>symbol</i> is prepotent which has the major effect in determining the position of a <i>heading</i> in the <i>indexing sequence</i> (Ranganathan)
primary chain :	a <i>chain of classes</i> whose first <i>link</i> is the original <i>universe</i> (Ranganathan)
primary phase :	in any <i>assemblage of phases</i> , that on which the main interest is focused (Ranganathan)
primordial schedule :	basic <i>schedule of elementary terms</i> (Ranganathan)
process term :	the <i>sub-heading</i> into which the <i>concrete term</i> is divided, the static or dynamic state of the concrete (Kaiser)
property :	a <i>category of substantives</i> (Vickery)
pseudo-classic :	a book which, not a <i>classic</i> , provokes other books about itself (Garde)
pure :	a <i>notation</i> which uses only one species of <i>digit</i> is pure (Ranganathan)
quasi-common isolate :	representation of a series of related terms by the same <i>isolate number</i> , which is thus quasi-common
	See <i>unscheduled mnemonics</i> (Ranganathan)

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quasi-discrete universe :	<i>universe</i> of separable but not separate <i>existents</i> (Ranganathan)
rameau :	an aggregate of <i>class terms</i> (Cordonnier)
ramification base :	the number of <i>classes</i> in a particular <i>array</i> is its ramification base (Cordonnier)
ramisyllabic notation :	a <i>notation</i> in which the <i>symbols</i> are built up of a succession of pronounceable syllables, e.g. "fudaci" or "bad lim toz" (Cordonnier)
rank :	the position of a <i>class</i> in an <i>array</i> (Ranganathan and Cordonnier)
reaction :	an interaction in which the individual entities interacting lose their identity (Vickery) a relation between <i>isolates</i> which are distinct and in temporary association (Farradane)
relative index :	one which shows aspects and relations of subjects in the scheme of <i>classification</i>
requisite :	see <i>capacity</i> (Bliss)
rigidity :	features of a <i>notation</i> which prevent it from displaying all the relationships existing between <i>class terms</i> and <i>isolates</i> (Ranganathan) Cf. <i>flexibility</i>
round :	in a <i>compound focus</i> , each <i>fundamental category</i> may be manifest more than once. Each such manifestation is a round (Ranganathan)
scalar series :	a <i>chain of classes</i> (Bliss)
schedule :	a series of <i>coordinate classes</i> arranged in order, with sub-classes intercalated (Bliss)
scheduled mnemonic :	the quality of a <i>schedule</i> of <i>classes</i> or <i>isolates</i> which recur as subdivisions of several classes (Ranganathan)
search rules :	the procedure to be followed in searching an index (Vickery)
section :	the first subclasses of a <i>main class</i> (Bliss)
"see" reference :	a <i>cross reference</i> from an index <i>heading</i> to the heading which contains the specific subject sought: this heading may be a synonym, an alternative spelling, a more general term, etc.
"see also" reference :	a <i>cross reference</i> from an index <i>heading</i> to one related to it: this heading may be a more general or more specific term, a <i>coordinate class</i> , or other related term
semantic elements :	the elements of meaning, independently symbolized, into which a subject <i>heading</i> may be divided. A combination of such elements is a semantic aggregate (Vickery)

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seminal constant :	<i>quasi-common isolate</i> (Palmer and Wells)
sequence number :	now replaced by <i>collection number</i>
sharpness :	the sharpness of <i>focus</i> indicates its <i>intention</i> (Ranganathan)
signature digit :	the common <i>symbol</i> prefixed to <i>class numbers</i> forming the <i>foci</i> in a <i>facet</i> to distinguish that particular manifestation of a <i>fundamental category</i> from other manifestations of it (Ranganathan)
significant symbol :	a <i>symbol</i> which represents a <i>substantive</i> (Ranganathan)
signpost :	a <i>symbol</i> whose function is to indicate the <i>category</i> of the following <i>class number</i> (Vickery)
simplicity :	generally used of notation. Used in a particular meaning of the product of the <i>base</i> and the <i>order</i> of a <i>classification</i> (Cordonnier)
sought and unsought links :	in <i>chain procedure</i> , terms in a <i>chain of classes</i> which are not likely to be looked for by a searcher, are <i>unsought links</i> (Ranganathan)
spatial sequence :	<i>arrangement</i> according to space
special isolate :	an <i>isolate</i> which is neither <i>common</i> nor <i>quasi-common</i> (Ranganathan)
species :	a sub-group of <i>genus</i>
specification :	definition by <i>specific differences</i> in characters (Bliss)
subdivision :	the grouping of several <i>subheadings</i> under one main heading in <i>verbal indexing</i> . Also, <i>divisions</i> of a <i>class</i>
subheading :	a <i>heading</i> in a <i>verbal index</i> , obtained by <i>subdivision</i>
subject device :	<i>division</i> or formation of an <i>isolate</i> or by another <i>class number</i> (Ranganathan)
subject-predicate relation :	a statement in which a property is predicated of a subject
subordination :	the placing of a subclass in its appropriate <i>class</i> (Bliss)
substance :	a <i>category</i> of <i>substantive</i> (Vickery)
substantive :	a term denoting a class or an isolate in a <i>schedule</i> is a <i>substantive</i>
substantive digits :	the lower case letters, capitals and the numerals 1 to 8 in CC (Ranganathan)
subsumic :	terms which are <i>members</i> of a <i>group term</i> , or <i>species</i> of a <i>generic term</i> , are said to be subsumed under the higher term
sumum genus :	the most <i>extensive class</i> in a <i>classification</i>
supercapacity :	see <i>capacity</i> (Bliss)

GLOSSARY OF CURRENT TERMINOLOGY

superimposed-array :	An array in which all isolates are not co-ordinate in the idea plane though apparently co-ordinate in the notational plane (Ranganathan)
symbol :	an arbitrary sign designed to represent something
syndetic heading :	an index <i>heading</i> which uses <i>inversion</i> , <i>subdivision</i> etc. to display relationship (Cutter)
syndetic index :	an index which displays relationships between its <i>headings</i> , not only by <i>indexing sequence</i> , but also by auxiliary devices such as <i>cross reference</i> (Cutter)
synthesis :	see <i>analytico-synthetic classification</i>
temporary relation :	a temporary association of <i>isolates</i> (Farradane)
term :	the unit in a <i>classification schedule</i>
terminology :	the system of <i>terms</i> used to <i>denote</i> or name the <i>classes</i> or <i>isolates</i> in a scheme of <i>classification</i> or in any discipline <i>schedule</i> (Ranganathan)
tool :	a relationship between <i>phases</i> (Ranganathan)
train of characteristics :	a succession of <i>characteristics</i> used in subdividing a universe so as to yield in succession wholes and not leading to organs or constituents (Ranganathan)
ultimate class :	the <i>class</i> of smallest extension and greatest intension available in a scheme of <i>classification</i> to accommodate subject under consideration (Ranganathan)
umbral :	a <i>heading</i> which is intimately relevant to the subject sought (Ranganathan)
unifocal :	a recorded thought is unifocal if it is exclusively on a single subject (Ranganathan) a subject is unifocal in a facet if it covers only one isolate in it (Ranganathan)
unitary class :	a <i>class</i> which contains only one entity (Ranganathan)
universe :	the field of knowledge which is to be classified
unscheduled mnemonics :	the association of a general thread of meaning with each of the digits of a notation. The following associations are put forward for the Colon Classification (Ranganathan) 2: Structure, morphology, parts, form 3: Function, physiology, activity, syntax, analysis 4: Fault, pathology, social ills, disease, transport, interlinking, synthesis 5: Fluidity, liquid, sap, blood, ocean

	6: Correction, remedy, financing, money, mysticism, abnormal types, phylogeny evolution
upper link reference:	7: Personality, magnetism, ontogeny, composition from one heading to another which is a subdivision of the former (Ranganathan)
vacant facet:	a facet which is not used in symbolizing a specific subject (Ranganathan)
verbal indexing:	indexing by the use of words as headings (Vickery)
versatility:	a measure of the degree to which a notation permits combination of elementary terms to form specific subjects. If S be the number of species of substance digits and C the number of connecting symbols, if one round and one level be permitted, and if there be no anteriorizing symbols, the versatility $V=SC$ (Ranganathan)
vertical notation:	see polyvalent (Cordonnier)

PAPER 1.3

ROLE OF ARRAY

D. B. Krishna Rao

[Defines 'Array', 'Order' and 'Mixed Array' and shows the demand of the Law of Parsimony to avoid mixed array. Illustrates the formation of new facet for organ divisions, in an analytical-synthetic scheme of classification. Shows succession of arrays can be used only for (W) [P] universe. Suggests routine revision of all the arrays of CC in the light of these findings]

1 Array

Consider the following examples of classes in CC and UDC:—

CC			UDC		
1	2	3	1	2	3
1	J1	J31	0	61	631
2	J2	J32	1	62	632
3	J3	J33	2	63	633
8	J4	J34	3	64	634
A	J5	J35	4	65	635
B	J6	J36	5	66	636
C	J7	J37	6	67	637
X	J8	J38	7	68	638
Y	J91	etc.	8	69	639
Z	J95		9	etc.	etc.
	etc.				

11 COLUMN 1

Each number in column 1 under CC denotes a main class. These are co-ordinate. They are also totally exhaustive of the universe of knowledge. These remarks hold good also for column 1 of UDC.

12 COLUMN 2

121 CC

Each number in column 2 under CC denotes a subclass of J (=Agriculture). J is called the immediate universe of these subclasses. These are coordinate. These are also intended to be totally exhaustive of J.

122 UDC

Each number in column 2 of UDC denotes a subclass of 6 (= Applied sciences). 6 is the immediate universe of these subclasses. These are co-ordinate. These are intended to be totally exhaustive of 6.

13 COLUMN 3

131 CC

Each number in column 3 under CC denotes a subclass of J3 (= Food crop). J3 is the immediate universe of these subclasses. These are co-ordinate. These are intended to be totally exhaustive of J3.

132 UDC

Each number in column 3 of UDC denotes a subclass of 63 (= Agriculture). 63 is the immediate universe of these subclasses. These are co-ordinate. These are intended to be totally exhaustive of 63.

14 DEFINITION

Each column in the above example is called an " Array ". Here is a formal definition by Dr. S.R. Ranganathan as given in

Prolegomena to library classification (Madras Library Association, publication series, 6), 1937, P 13.

An Array is the sequence of classes of a universe arranged among themselves according to their respective ranks.

15 ORDER

Column 1 in CC is an Array of Order 1. Similarly column 2 is an Array of Order 2. Column 3 is an Array of Order 3. The order of an Array is determined by the number of its remove from the original universe. The *Prolegomena* gives the following definition.

The Order of a Class is the number of successive characteristics used to derive the class from the original universe.

The Order of an Array is the same as that of its class.

All these remarks apply equally to the columns of UDC.

2 Mixed Array

Consider the following classes of "L Medicine" in CC. These occur in the Organ Facet. This is [P].

214	Tooth	21432	Canine
21411	Gum	21433	Lateral incisor
21412	Enamel	21434	Central incisor
2142	Part	21435	First molar
21421	Root	21436	Second molar
21422	Neck	2145	Dentine
21423	Crown	2146	Pulp cavity
2143	Kind of tooth	215	Fauces
21431	Milk		

Each subdivision of "2143 Kind of tooth" represents a whole tooth. Indeed it represents (W) [P] (= Whole Personality). On the other hand each subclass of "2142 Part" represents one part of a tooth. Indeed it represents a (\bar{W}) [P]. [\bar{W}] = Not whole). These divisions are the results of dewholing

(\bar{W}) [P]. In the former set, each isolate is a Group Isolate. In the latter set, each isolate is an Organ of a typical whole individual. See *Optional facets* (15) by S.R. Ranganathan published in the *Annals* of the Indian Library Association of the *Abgila*, 3, 1953, 1—8. There, Organ is defined as follows :

Organ Ω (\bar{W}) not having all the attributes of (W) but distinctively associated with or uniquely specific to the (W)

21 LAW OF PARSIMONY

Each of these Organ Isolates does exist in a typical tooth of each of the group isolates of the first set. There are six Group-Isolates in the first set. There are also three Organ-Isolates in the second set. By combining each of the first set with each of the second set in every possible way, we get 18 Isolates. The schedule should, strictly speaking, mention these 18 Isolates in addition to mentioning the $9(6+3)$ as already done. This may be generalised as follows :

With m isolates of (W) [P] and n isolates of (\bar{W}) [P], the number of isolates to be enumerated will be $m+n+mn$. Law of Parsimony would naturally protest against such a long schedule.

22 ANALYTICO-SYNTHETIC SCHEME

The preference of an analytico-synthetic scheme of classification to an enumerative scheme is insisted upon by the Law of Parsimony. See Pp 137-139 of the *Prolegomena*. How does an analytico-synthetic scheme satisfy the Law of Parsimony ? The answer of the CC is this : Give the m isolates of the first set as a separate schedule. Similarly give the n isolates of the second set as a separate schedule. The following is the result :—

221 Group-Isolates of the

(W)[P] “214 Tooth”

- | | |
|-------------------|-------------------|
| 1 Milk | 4 Central incisor |
| 2 Canine | 5 First molar |
| 3 Lateral incisor | 6 Second molar |

222 Organ-Isolates of the

 $(\bar{W})[P]$ "214 Tooth"

1 Root	5 Body
2 Neck	8 Crown

Note :—The number of isolates in this table has been increased. The isolate numbers have also been made mnemonic.

23 DEFINITION

The array of section 2 mixes up group isolates and organ isolates. It is therefore a Mixed Array. A Mixed Array is considered a fault according to the Law of Parsimony. On the other hand the array in each of the sections 221 and 222 is a Pure Array. We may provide the following definitions.

A Pure Array contains only either (W) $[P]$ isolates or (\bar{W}) (P) isolates.

Paper 1.8 of Shri V.S. Moghe deals with the formation of new facets to accommodate (\bar{W}) $[P]$ isolates. My paper confines itself to Pure Arrays with (\bar{W}) $[P]$ isolates only.

3 Succession of Arrays

A succession of arrays is formed by a successive division of a (W) $[P]$ Universe. Each such division is based upon its different characteristics. The succession of characteristics leading only to arrays with (W) $[P]$ isolates is defined as a "Train of Characteristics."

The totality of the (W) $[P]$ arrays formed with the aid of a Train of Characteristics constitutes a "Facet."

"Facet" also denotes the totality of (W) $[P]$ isolates in all the arrays of a facet.

4 History

Edn 1 of GC (1933) speaks only of "Characteristic." There is no mention of change in characteristic from array to

array. *Prolegomena* (1937), makes mention of this phrase for the first time in page 196. The later editions of CC, including the latest (1952), take 'Train of Characteristic' only as an assumed term. They seek to illustrate it. They do not define it. Probably the source of difficulty was the mixed nature of some of the arrays. The Role of Array and the Role of Facet were not properly distinguished. This point has been clarified only in Dr. S.R. Ranganathan's *Optional facets* (15) published in *Abgila* 3, 1953, 1-8.

The role of Array is now made definite.

5 Number of Arrays

The next question for consideration is the number of arrays possible in a facet. Every array with group-foci will admit of formation of further arrays. No array with individual-foci will admit of it. Therefore an array with individual foci will be the last array of a facet. The number of arrays in a facet will depend upon the number of successive characteristics to be used to reach an array of individual foci.

51 EXCLUSION OF LAST ARRAY

Individual-foci are best represented by alphabetical device. For they are likely to have proper names. In other cases, chronological and/or geographical device may be used. At the same time it is seldom that individual-foci will be reached in library classification. Therefore the number of arrays in a facet will not generally have to take the last possible array into account.

52 RELEVANCE

The number of arrays needed in a facet will depend upon the number of relevant characteristics available for dividing the (W) [P] Universe. This will vary from universe to universe and from context to context. Incidentally it may be remarked that the number of arrays in a (W)[P] facet will be the same as

the number of characteristics suitable for inclusion in the associated train of characteristics.

6 Routine Revision

61 CC

The [P] schedule of CC for tooth requires to be revised in the light of the role of arrays now defined. All the mixed arrays should be systematically spotted out. They should be broken up into separate facets for (W) [P] and (W) [P] isolates. The unscheduled mnemonics for use will be different for (W) [P] and (W)[P] arrays. In the light of the relevant mnemonics, the (W)[P] arrays should be recast with appropriate isolate numbers.

7 Problems

1 The problems awaiting solution in the role of arrays have been discussed in paper 1.18 of Ranganathan and paper 1.20 of Krishna Rao. Ranganathan has dealt with the first order array of the universe of knowledge itself. Its last octave is now occupied by the main classes. This was the octave to be first occupied. Edn 4 (1952) of CC has already occupied the pre-first octave with Generalia Anteriorising Common Isolates. It has also occupied the first octaves. An explanation of the latter will be found in paper 1.18 of Ranganathan. This paper has also suggested a possible use for the penultimate octave. But work needs to be done to fill up this penultimate octave either mnemonically or otherwise.

2 The allocation of the last three octaves between chronological device, and alphabetical device is now being done *ad hoc* for each array. It is desirable to discover some general guiding principles in this matter.

3 Difficulties arise in the occupation of the last octaves of two consecutive arrays. The cause of this difficulty is the isolate number in the last octaves having a varying number of signi-

ficant digits. This difficulty is concretely brought out in paper 1-20 by Krishna Rao. This problem awaits investigation and solution.

PAPER 1-4

ROLE OF OCTAVE

S. Parthasarathy

[Traces the history of Octave Notation in UDC and CC. Explains the way in which the diverse octaves are specialised for use in special ways and for special purposes. Shows the role of Octaves to be increase in Hospitality in Array. Makes a list of the problems requiring further investigation].

0 Introduction

The role of octaves stems from the notational plane. Octave notation is a device for breaking one of the rigidities of notation, viz., Closed Array. It secures infinite hospitality in array. Theoretically, it can accommodate an infinite number of co-ordinate classes in one and the same array.

1 Example

Let us take for example the arabic numerals in a decimal-fraction-notation. We have the digits 1, 2, 3, 4, 5, 6, 7, 8 and 9. Ordinarily these nine digits can accommodate only nine co-ordinate classes. If all the nine digits are used up, it is not possible to accommodate additional co-ordinate classes in a helpful sequence. That is, the array becomes a Closed Array. This is a rigidity in notation. Octave notation breaks this rigidity. Digits 1 to 8 are used to accommodate the first eight co-ordinate classes. The ninth class is accommodated not by the digit 9 but by 91, the tenth class of by 92..... the sixteenth class by 98, the seventeenth class by 991, and so on to infinity. That is, the co-ordinate classes can be numbered as follows: 1,2,3,4,5,6,7,8,91,92,93..... 98,991,992,993....998, 9991,9992, 9993.....9998,99991.....to infinity. It can be seen that the digit 9 by itself does not stand for any class. It

is not a substantive, nor is it a connective. Its role is only to start the next octave of substantives. It is, therefore, called "Octavising Digit".

2 History

The notational device for meeting the demands of hospitality in array has been different in different schemes of classification.

21 DC

In DC (= Decimal Classification), whenever there are more than eight classes to be accommodated in an array, digits 1 to 8 are used for 8 most important classes and the digit 9 is used for all the 'other classes'. This is not a solution. It is just a makeshift device to meet a situation. Beyond the first eight classes in an array, no sequence is attempted. Moreover, digit 9 is not reserved for 'other classes' in all places.

2 SC

The notational device used in SC (= Subject Classification) for providing hospitality in array is gap-notation. Naturally, its hospitality is limited to the extent of the gap left. Further, hospitality in chain also takes a share of these gaps. But there is also a provision for accommodating new classes at any point 'by treating the existing numbers as decimals and adding the units from 0 to 9 as found necessary' (see Brown : *Subject classification*, 1914, p. 14). This does not prove sufficient.

23 LC

Gap notation is also used by LC (= Library of Congress Classification) for accommodating new classes arising in an array as well as in a chain. Though the extent of the gaps left in LC is considerably greater than that of SC, still its hospitality is limited. LC also uses a similar device as SC for accommodating new classes at any point.

24 UDC

Since UDC (= Universal Decimal Classification) has DC as its core, it carries with it all the notational limitations of DC. But it does not reserve digit 9 for 'other' classes as in DC. It provides for hospitality in array by using Phase Relation. This is a most uneconomical way of accommodating new classes. On account of this, the digits in class numbers of UDC swell considerably. At the Hague Conference (1948) of FID, Dr. S.R. Ranganathan moved the adoption of octave notation by UDC. At the Copenhagen Conference (1952), on the motion of Mr. Lloyd, steps have been taken to implement the idea.

25 CC

In edn 1 (1933), CC had made profuse use of octave device. But it was not done consciously. Closed Arrays had therefore crept into some places. An objective examination of the notational features of CC by its author himself led to a recognition and the naming of the Octave Device. This was first announced in his *Prolegomena to library classification* (1937), p 100. The later editions of CC exploit the device progressively.

3 Groups of Octaves

In CC three species of substantives are used (1) lower case letters, (2) arabic numerals, and (3) capitals. All these can figure in one array: $a, b, c, \dots, x, y, z, 1, 2, 3, 4, \dots, 7, 8, 91, 92, \dots, 98, 991, \dots, 9A, \dots, 9Z, A, B, C, \dots, X, Y, Z$. The species are mentioned above in the ascending sequence of their ordinal values.

31 FIRST OCTAVES

Since 9 is octavising digit, numbers 1 to 8 form the first octave, numbers 91 to 98 form the second octave, numbers 991 to 998 form the third octave. This can be continued *ad infinitum*. In each of these infinity of octaves the first significant digit is an

arabic numeral. The totality of the infinity of octaves with an arabic numeral as the first significant digit is called First Octaves.

32 PRE-FIRST OCTAVE

The lower case letters *a* to *z* come earlier than 1 to 8 which form the first octave. Therefore *a* to *z* are said to form the Pre-First Octave.

33 LAST OCTAVES

A to Z form an octave of their own. A is greater than 9 in its ordinal value. Therefore the octave A to Z will come after all the octaves whose first digit is any numeral 1 to 9. Nothing can come after the octave A to Z. Therefore it is called the Last Octave. The phrase 'Last Octave' naturally leads us to look for the Penultimate Octave. It is formed by 9A to 9Z. Similarly 99A to 99Z form the Third Last Octave. This can be continued backwards *ad infinitum*. This infinity of octaves will come naturally after the infinity of first octaves. They are therefore called Last Octaves. The first significant digit in a number of any of the last octaves will be a capital letter.

34 EVOLUTION

The genesis of the above idea will be found in *Impact between mathematics and library science* by Dr. Ranganathan (see *Modern librarian*, 10, 1940, pp 22-23). Its substance was also given in edn 2 (1939) of CC, P 1.60. The present position as set above was finalised in *Optional facets* (9) by Dr. Ranganathan (see *Annals* part of *Abgila*, 2, 1952, 184).

35 SPECIALISATION

CC specialises the use of the several categories of octaves. This is rendered possible by the mixed notation it uses. This aspect of the problem is pursued by Shri D.B. Krishna Rao in paper 1.11.

4 Utilisation of First Octaves

The first octaves are used for classes derived on the basis of a characteristic special to the subject. The number of these octaves brought into use will naturally depend upon the number of foci yielded by the characteristic.

41 FIRST OCTAVE

The first octave is utilised for foci that attract a considerable quantity of literature. Such foci may be called 'Favoured Foci'. For example in [P] of "J Agriculture " we have the following foci :

1 Decoration	7 Fabric
2 Feed	8 Dye
3 Food	91 Adhesive
4 Stimulant	92 Manure
5 Oil	93 Vegetable
6 Drug	

Classes represented by 1 to 8 attract a considerable quantity of literature. They are favoured foci. Therefore they are accommodated in the first octave.

42 SECOND OCTAVE

As shown in the above example, in some subjects the number of foci is more than eight. Then the excess over the eight are taken over to the second octave. Which should be accommodated in the first octave and which in the second, that is the question. The convention adopted is as follows: The eight most favoured foci are placed in the first octave. The 'Second lot of Favoured Foci' are placed in the second octave.

43 OTHER FIRST OCTAVES

Similarly the 'Third Lot of Favoured Foci' are placed in the third octave and so on. In practice, however, the fourth octave is seldom reached. It is even more so with still higher octaves.

5 Utilisation of Pre-First Octave

The pre-first octave is used to accommodate common subdivisions. Till 1952 all common subdivisions were deemed to be anteriorising. This concealed the existence of pre-first octave. However, in *Optional facets* (6) (see *Annals* part of *Abgila*, 1, 1950, 153-164) Dr. Ranganathan analysed the hotch-potch of common subdivisions. They got separated into a small residue of anteriorising common subdivisions and quite a variety and number of posterior common subdivisions. Further the posterior common subdivisions got sifted out as manifestations of diverse fundamental categories. This meant that appropriate connecting symbols had to be prefixed to them. This disclosed their correct occurrence in pre-first octave. Edn 4 of CC (1952) has given schedules for some of the kinds of pre-first octave. It may be remarked here that the analysis of *Optional facets* (6) transferred certain common subdivisions to Book Numbers. These are examined by Shri Ujlambkar in paper 1-13.

6 Utilisation of Last Octaves

By definition, the first significant digit of a focal number in any of the last octaves is a capital letter. A capital letter can initiate (1) the number of a Basic Class, (2) a Chronological Number, and (3) a number got by Alphabetical Device. Obviously, the same octave should not use the capital letters in all the three ways. Each way should be assigned to a separate octave. For example, in the last octave, it may implement Subject Device. In the penultimate octave, it may implement Chronological Device. In the third last octave, it may implement Alphabetical Device. These may be permuted in all the six possible ways. Which is the permutation to be preferred? That is the question. The answer is not as uniform as in the case of the first octaves. The preferred permutation will depend upon the relative proportion of the literature attracted by the class numbers formed by the respective devices. The device yielding the

favoured foci should be used in the last octave, for such foci will then be formed of a single digit. The device yielding the second lot of favoured foci should be placed in the penultimate octave. Its foci will be made of two digits. The device yielding the third lot of favoured foci should be placed in the third last octave. These foci will be made of three digits. This convention will satisfy the Law of Parsimony.

61 EXAMPLES

In the subdivision of Space Facet, Chronological Device is used in the last octave, the penultimate octave is used for Orientation Divisions, and Subject Device is used in the third last octave. This is discussed by Shri R.S. Goyal in paper 117 on geographical divisions.

e.g.	44X	Mughal India	(Chronological Device)
	449E	North India	(Orientation Division)
	4499D	Engineering	
		Divisions of India	(Subject Device)

In the Personality facet of the subject ' Cycle ', Alphabetical Device is used in the last octave, Subject Device in the penultimate octave, and Chronological Device in the third last octave.

e.g.	D5125R	Raleigh cycle	(Alphabetical Device)
	D51259D	Auto-cycle	(Subject Device)
	D512599N	20th century models	(Chronological Device)

In the Personality Facet of Economics, Chronological Device is used in the last octave and Subject Device in the penultimate octave.

e.g.	XN	Public utility	(Chronological Device)
	X9J	Agricultural economics	(Subject Device)

7 Other Findings

In certain cases the use of octave notation is not economical. This happens in the case of a universe whose entities are known and are finite in number. A point beyond which the use of octave notation becomes uneconomical is called 'Critical Point'. Group notation can be used when the number of entities exceeds the critical point. The critical point depends upon the base of significant digits. If the base is eight, then 24 is the critical point. This is examined in section 4 of *Optional facets* (11) by Dr. Ranganathan (see *Annals* part of *Abgila*, 2, 1952, 248). Of course, the number of cases where the use of octave notation becomes uneconomical is few.

7.1 POINT OF HOSPITALITY

In CC, the octaves stem from only one point. That is, hospitality in array is obtained only between the digits 8 and A. Interpolation of new classes in an array at other points is not available. For example, between the digits 1 and 2, or 2 and 3, or 7 and 8, or A and B, there is no provision for inserting a new class belonging to the same array. This is a limitation. It is possible to get over this limitation by providing a digit having the highest ordinal value for interpolating new classes in an array at any point. This will secure hospitality in array at any point. Whether such a device is necessary at all has to be examined.

8 Problems to be solved

The primary role of octave notation is to secure hospitality in array. It also lends itself for the use of mnemonics, both scheduled and unscheduled. A full exploitation of the octaves in an array increases the Versatility (see section 577 of *Optional facets* (9) for definition) of a scheme of classification. The following problems are still to be pursued:

1. Will the same kind of specialisation of octaves be applicable to all arrays, or will it vary with the order of the array?

2. If the finding under (1) calls for difference in specialisation of octaves, further work has to be done to find out helpful general principles.
3. Will the same kind of specialisation of octaves be applicable to all facets, or will it vary with the nature of the facet ?
4. If the finding under (3) calls for difference in specialisation of octaves according to different facets, further work has to be done to find out helpful general principles.
5. Will the same kind of specialisation of octaves be applicable to all subjects, or will it vary from subject to subject ?
6. If the finding under (5) calls for difference in specialisation of octaves according to different subjects, further work has to be done to find out helpful general principles.
7. Securing hospitality in array at any point.

PAPER 1.5

Role of Fundamental Categories

K.D. Puranik

[Traces, with examples, the emergence of the concept of the Fundamental categories—Time, Space, Energy, Matter and Personality—first in an incipient form and later in a full-fledged form in CC. Prescribes their order of sequence in the facet-formula to be the reverse of the one given above. Traces the latest developments. Indicates problems for further investigation. Complex nature of Energy is one of them].

0 Introduction

Depth Classification is needed in documentation work. There are two steps in depth classification :

- 1 Recognising the facets in a micro-unit of thought embodied in an article of a periodical ; and
- 2 Translating the names of the isolates in them into isolate numbers.

The Fundamental Categories are of much help in the first problem.

1 Example

11 EXAMPLE 1

The subject "Circulation of newspaper in an industrial library" belongs to the main class Library Science. "Circulation" is a focus in the Problem Facet of Library Science. Both of these—the focus "Circulation" and the facet "Problem"—are regarded as manifestations of the Fundamental Category "Energy." The focus "Newspaper" and its facet "Material" are regarded as manifestations of the Fundamental Category "Matter". The focus "Industrial library" and its facet "Library" are regarded as manifestations of the Fundamental Category "Personality."

12 EXAMPLE 2

The subject "Sentiment of criminals in Orissa in 1950's" belongs to the main class Psychology. The focus "1950's" and its facet "Chronology" are regarded as manifestations of the Fundamental Category "Time". The focus "Orissa" and its facet "Geographical area" are regarded as manifestations of the Fundamental Category "Space". The focus "Sentiment" and its facet "Problem" are regarded as manifestations of the Fundamental Category "Energy". The focus "Criminals" and its facet "Entity" are regarded as manifestations of the Fundamental Category "Personality."

13 EXAMPLE 3

The subject "Extra-Curricular activities of university students in Bombay in 1952" belongs to the main class Education. The focus "1952" and its facet "Chronology" are regarded as manifestations of the Fundamental Category "Time". The focus "Bombay" and its facet "Geographical area" are regarded as manifestations of the Fundamental Category "Space".

The focus "Extra-curricular activities" and its facet "Problem" are regarded as manifestations of the Fundamental Category "Energy". The focus "University students" and its facet "Educand" are regarded as manifestations of the Fundamental Category "Personality."

14 EXAMPLE 4

The subject "Silver currency in India during the 19th century" belongs to the main class "Economics". The focus "19th century" and its facet "Chronology" are regarded as manifestations of the Fundamental Category "Time". The focus "India" and its facet "Geographical area" are regarded as manifestations of the Fundamental Category "Space". The focus "Silver" and its facet "Material" are regarded as manifestations of the Fundamental Category "Matter". The focus "Currency" and its facet "Business" are regarded as manifestations of the Fundamental Category "Personality."

15 EXAMPLE 5

The subject "India's foreign policy in the 20th century" belongs to the main class "History". The focus "20th century" and its facet "Chronology" are regarded as manifestations of the Fundamental Category "Time". The focus "Foreign policy" and its facet "Problem" are regarded as manifestations of the Fundamental Category "Energy". The focus "India" and its facet "Community" are regarded as manifestations of the Fundamental Category "Personality".

2 Incipience

The above examples show the Fundamental Categories Time, Space, Energy, Matter and Personality manifesting in different subjects. The idea of Fundamental Categories was first stated by Ranganathan in his *Library classification : Fundamentals and procedure*. To trace the history of this idea, we should trace the development of classification.

21 DC AND LC

Both DC (= Decimal Classification) and LC (= Library of Congress Classification) are enumerative schemes. They each prescribe only one schedule enumerating ready-made class numbers for different subjects.

22 SC

SC (=Subject Classification) provided two schedules of numbers:

- 1 Classification Tables of Main Classes ; and
- 2 Categorical Tables.

Numbers from these two could be combined to construct a Class Number.

23 UDC

UDC (=Universal Decimal Classification) provided one schedule of Main Classes and several schedules of Auxiliary Numbers; Language, Form, Place, Time and Point of view. Starting from a Main Class Number, Isolate Numbers from the auxiliary schedules could be added after it to construct a Class Number. UDC also provided schedules of Special Analytical Numbers applicable to particular Main Classes and their Sub-classes. Here it must be remembered that the term Main Class in UDC means any class enumerated in DC and similar ones in UDC, and not merely the ten Main Classes in the first schedule of DC. The term Auxiliary Class is used in UDC in contradistinction to this use of the term Main Class.

The UDC allows the isolate numbers of the auxiliary schedules to be combined in any sequence. Again the same schedule can be used more than once in constructing a Class Number. There is thus no restriction whatsoever on the use of the schedules.

3 CC

CC (=Colon Classification) went a step further. It too provided separate schedules for Common Sub-divisions, Chronological Divisions, Geographical Divisions and Language Divisions. In addition, it provided different schedules of Isolates for different Main Classes. The totality of the isolates based on a single train of characteristics was called a Facet. See Rule 6921 of edn 4, 1952. It also provided a Facet Formula. This formula prescribed the sequence among facets. Facets had to be indicated by the insertion of colons. As a result, two or more colons appeared together not infrequently. This was irritating.

31 PREFERENCE

A count of the number of commonly occurring facets of CC was made. Its 52 Main and Canonical Classes together have 143 facets. The average number of facets for a class is thus 2.75. We may take this as 3 in round figures. The facet-formula for a Basic Class prefers one of the possible six sequences among the three facets, as being more or less helpful. This preference is made *ad hoc* for each Basic Class.

4 Crisis

With this simple *ad hoc* method, CC individualises macro thought embodied in books, with success. But since the Second World War, research-work-in-team has been flooding us with micro thought. The need for serving research workers with these micro-units of thought, has also increased. It has therefore become necessary to arrange these in a helpful sequence. For that purpose, these have to be classified to the point of individualisation. This has led to a crisis.

41 FAILURE OF CC

An attempt to classify micro thought with CC revealed its inadequacy and helplessness. Articles are almost always found to have more facets than the ones prescribed in the facet-

formula. Some facets in an article might not have been represented in the facet-formula. Also some facets in the formula would not be required in a particular case. The result would be :

- 1 Unindividualising Class Number ; and
- 2 Occurrence of more than one connecting symbol together.

It is not possible to give the average number of facets of an article or other micro thought, without a survey and count. Also the number will vary from subject to subject. But in any event the number is likely to be more than three.

42 MULTITUDE OF POSSIBLE SEQUENCES

Let us first take the number of facets to be 4. It is possible to have 24 different sequences of these four. Three or four of these sequences may be more or less equally helpful. To prefer any one sequence consistently is therefore difficult. It is not so difficult with three. For we have to choose only one out of six possible sequences. The classificationist can do this consistently by sheer flair.

The difficulty of choosing a helpful sequence and the risk involved therein increases with the increase in the average number of facets. With 5 facets the number of sequences, from which one has to be preferred arbitrarily, is 120. With 6 facets, one sequence has to be preferred arbitrarily out of 720. In general, with n facets, the number of sequences of facets from which one has to be forcedly preferred is $n!$ ($=1.2.3.....n$).

43 MULTITUDE OF FACET-FORMULAE

There is also another difficulty. That is of prescribing elaborate facet-formulae for all the Main and Canonical Classes, so as to meet any situation.

44 RESTRICTION OF CLASSIFIER'S AUTONOMY

Again such a prescription—even if it is done after surmounting all the difficulties—means limiting the autonomy of the classifier. A particular subject may over-reach all prescribed facet-formulae. Then a classifier would be required to look to the classificationist for help in fixing its class number. This is not desirable. This crisis must be resolved.

5 FUNDAMENTAL CATEGORIES

The difficulties mentioned above led to a re-examination of the foundation of classification. Was there anything common behind the different facets in different subjects? Did they stem from a common root? This was the question pursued.

51 THEIR RECOGNITION

Already Space and Time are given special treatment. Separate schedules are given for them both in CC and UDC. These facets can be used in any subject. This led to a conjecture. Certain groups of facets belonging to different subjects might also have something in common. A comparative scrutiny of the facets did disclose their falling into three groups. This disclosure led to the recognition of something common behind all facets of a group. In this connection, the listing together of the names of all facets in section 632 of edn 3 of *Cc* was of help. No doubt this commonness was hidden by the terms in natural language used to denote the facets in the verbal plane. But a dive into the idea plane helped to sense the fundamental identity of the roots of all the facets of a group. The three common roots of the three respective groups were recognised as the three fundamental categories: Energy, Matter and Personality. These three were in addition to the obvious ones, Time and Space.

52 THEIR HELP

Their recognition gives help along two lines:—

- 1 It is possible to identify each of the facets of different subjects with one or other of the five Fundamental Categories; and

- 2 A search for the manifestation of Fundamental Categories in a new subject facilitates the spotting out of its facets.

The second of these is particularly useful in Depth Classification. Each Micro Thought brings with it its own facets. A classifier must be equipped to recognise them, to separate them out, and to arrange them in a helpful sequence. Only then he will be able to fit the subject with an individualising class number without *ad hoc* dependence on the classificationist.

521 An Analogy

In June 1950, Dr. Warren Weaver of the Rockefeller Foundation gave Dr. Ranganathan an unpublished memorandum of his. It was entitled "Translation". Its section 8 was entitled "Language and Invariants". This section contains the following words:

- "Indeed...the most promising approach of all is...one that goes so deeply...as to come down to the level where they exhibit common traits.
- "Think, by analogy, of individuals living in a series of tall closed towers, all erected over a common foundation. When they try to communicate with one another they shout back and forth, each from his own closed tower. It is difficult to make the sound penetrate even the nearest towers, and communication proceeds very poorly indeed. But when an individual goes down his tower, he finds himself in a great open basement, common to all the towers. Here he establishes easy and useful communication with the persons who have also descended from their towers.
- "Thus may it be true that the way...is not to attempt the direct route, shouting from tower to tower. Perhaps the way is to descend...down to the

common base of human communication—the real but as yet undiscovered universal language—and then re-emerge by whatever particular route is convenient.”

The Five Fundamental Categories, struck at by Dr. Ranganathan, appear to lie very close to “the common base” of human thought. They disclose at their level the identity of pattern in most subjects. It is for this reason that the categories are called “Fundamental Categories”.

53 THEIR SEQUENCE

Edns 1 to 3 of CC lay down the sequence of facets in each facet-formula. Examples given in section 61 of edn 4 are mere explanations. They are nothing more than a subtle pleading for the acceptance of the preferred sequence. The author himself had evidently fixed the sequence in facet formulae without reasoning—by mere flair. This cannot always give consistent results even for one person at all times. The change of sequence of facets in the facet-formula of Law in edn 2 proves the unreliability of mere flair. Dr. Ranganathan himself used to say that he was not happy about the sequence of facets in facet formulae for Library Science and Chemistry. Edn 4 has made the necessary changes. This inconsistency will be much greater if the sequence is to be determined by diverse classificationists. This will produce chaos. How to avert such a chaos in spite of giving autonomy to the classifier? That is the problem.

531 Principle of Decreasing Concreteness

By 1945 it was found by induction that the class number should arrange books on the shelves according to the Principle of Increasing Concreteness. This was enunciated in Ranganathan's *Elements of library classification* (Kaikhushru Taraporevala memorial series in library science, 4) 1945.

532 Principle of Inversion

From this it was but a simple step to reach the Principle of Inversion established in section 25 and its subdivision of Ranganathan's *Philosophy of library classification* (Library research monographs of the University Library, Copenhagen, 2), 1951. According to this principle the sequence of facets in a facet formula should be that of decreasing concreteness.

533 Prescription of sequence

The determination of the comparative concreteness of the facets of a micro-thought is arduous. But it is not so arduous to arrange the Five Fundamental Categories in a sequence of decreasing concreteness. In fact, it has been prescribed in Ranganathan's *Optional facets* (1), appearing in *Annals of the Indian Library Association* forming part of *Abgila*, 1, 1950, to be as follows:

Personality, Matter, Energy, Space and Time.

534 Transfer of difficulty

The present practice is as follows:

The classifier should be able to relate each facet to the appropriate Fundamental Category. If this is done the sequence of facets is automatic.

535 Example 1

Let us take example 1 of section 11. In the following lines the isolates of the subject are first separated. They are then replaced by the Fundamental Categories of which they are manifestations. Thereafter the Fundamental Categories are arranged in order of decreasing concreteness. Lastly the Fundamental Categories are replaced by their manifestations.

- 1 [Circulation] [Newspaper] [Industrial library]
- 2 [Energy] [Matter] [Personality]
- 3 [Personality] [Matter] [Energy]
- 4 [Industrial Library] [Newspaper] [Circulation]

Of course, we must add Library Science at the head of all these.

536 Example 2

Similar steps for example 2 of section 12 are as follows :

- 1 [Sentiment] [Criminal] [Orissa] [1950's]
- 2 [Energy] [Personality] [Space] [Time]
- 3 [Personality] [Energy] [Space] [Time]

537 Example 4

The following are the steps for example 4 of section 14 :

- 1 [Silver] [Currency] [India] [19th century]
- 2 [Matter] [Personality] [Space] [Time]
- 3 [Personality] [Matter] [Space] [Time]
- 4 [Currency] [Silver] [India] [19th century]

54 FURTHER DEVELOPMENTS

Once Fundamental Categories were recognised, it was easily seen that the same fundamental category manifests itself more than once in some subjects. It was found necessary to have the manifestations expressed in the Class Number. This led to the idea of Rounds and Levels. These concepts are discussed in papers 1·7 and 1·8 by Shri Isaac and Shri Moghe respectively. The implementing of the idea of Fundamental Categories in an elegant way led to an examination of Connecting Symbols. These are discussed in paper 1·6 by Shri Ramabhadran.

6 Impersonation

The Fundamental Category Personality often eludes. This is due to the fact that any other Fundamental Category may also be used to represent a manifestation of Personality.

61 SPACE AS PERSONALITY

In History, the Personality of the national group studied is represented by Geographical Numbers. In fact, the facet itself was originally called Geographical Facet. This name is misleading. It should be called Community Facet. For the

history is not of the geographical area occupied but the community itself. It is a case of using container for contained—Synecdoche!

62 OTHER IMPERSONATIONS

Several other possible impersonations have been described in Ranganathan's *Philosophy of Library classification* (Library research monographs of the University Library, Copenhagen, 2), Section 2525.

63 CAUTION

Classifier should develop sufficient familiarity with all such possible impersonalities. Then only he can exercise his autonomy.

7 Unsolved problems

71 OBJECTIVE TEST

At present the recognition of the Fundamental Category behind a facet is largely left to flair. By personal face to face discussion, the Library Research Circle at Delhi is getting atuned to it. But this method is not available in communicating with colleagues in distant lands. Written or printed words are bereft of the help of personal communication. But this basic approach to classification cannot lead us to the best of results without an objective method of recognising the Fundamental Categories in facets. More work in the field may eventually lead to such objective tests. This is unsolved problem 1.

72 ENERGY

The Fundamental Category Energy appears to be the most difficult. Mr. Vickery has rightly indicated that the concept covered by Energy is multiple and not single, (See sections 24-26 of *Optional facets* (17) appearing in the Annals of the Indian Library Association, Abgila, 3, 1953, 1-8). He has even suggested replacing Energy by more than one Fundamental Category. This too requires investigation.

ROLE OF CONNECTING SYMBOL

PAPER 1-6

ROLE OF CONNECTING SYMBOL

S. Ramabhadran

[Describes the six different purposes served by Connecting Symbol. Traces the evolution of Connecting Symbol. Points out the desirability of CC adopting different Connecting Symbols for Time and Space Facets and UDC for Energy, Matter and Personality Facets.]

1 Role of Obviating Ambiguity

In an enumerative scheme of classification, a class number is without structure. It has no segments. DC (=Decimal Classification) Number is an example. The decimal point has no substantial function. It merely produces the appearance of a segment. On the other hand, in an expressive analytico-synthetic scheme of classification, a class number has structure. It has segments. The segments have to be linked up by connecting symbols. The segments are called Isolates. They represent Isolate Ideas. These are substantives. A connecting symbol does not represent an idea. It is merely a connective. UDC (=Universal Decimal Classification) Number was the first influential class number with segments. CC (=Colon Classification) Number is another example of class numbers with segments.

11 CONCRETE APPROACH

We should first realise the ambiguity resulting from omitting connecting symbols in an analytico-synthetic scheme of classification. A concrete example will lay this bare.

CC No.	Subject	Subject	UDC No.
X·73	Economic condition of USA	Economic condition of USA	33 (73)
X73	State-owned property	Protection	337·3

We can see from the above table the result of omitting connecting symbols. Let us omit the connecting symbol in the examples in the first line. Then the CC Number X73 can mean either of the two subjects mentioned in column 2. In other words, X73 becomes a homonym. Similarly the UDC No. 3373 can mean either of the subjects mentioned in column 3. In other words, 3373 becomes a homonym. A homonym leads to ambiguity in any language. In classificatory language, it will mix up different classes. It should therefore admit of no homonym. This has been stressed by Dr. S.R. Ranganathan as one of the essential qualities of a classificatory language in several of his writings:—

- 1 Section 17 of *Library classification: Fundamentals and procedure* (Madras Library Association, publication series, 12), 1944.
- 2 Quality 41 given in section 214 of *Philosophy of library classification* (University Library, Copenhagen, library research monographs 2), 1951.
- 3 Section 134 of *Classification and communication* (Delhi University publications, library science series, 3), 1951.

12 CONCLUSION

Role 1 of a connecting symbol is to avoid incidence of homonym in an analytico-synthetic scheme of classification.

2 Role of Separation and Connection

In the notational plane, we are guided by what is visible. Apparently the connecting symbol separates the isolate of one facet from that of the succeeding facet. But the role of the connecting symbol can also be taken to be that of connecting the two consecutive isolates. This connecting role is emphasised in the idea plane.

3 Role of Indicating Fundamental Categories

In paper 1-5, Shri K.D. Puranik has stated that the concept of Fundamental Category originated in 1949. The

implementing of this concept depended upon the capacity of connecting symbols. In *Optional facets* (1) published in June 1949 in *Abgila* 1, 1950, 25-36, Dr. Ranganathan hit upon the idea of devising a distinct connecting symbol for each Fundamental Category as shown below. He utilised the conventional punctuation marks for the purpose. This cleared the way. In their *Fundamentals of library classification* (Practical library handbooks, 12), 1951, p 65, Messrs. Palmer and Wells used the expressive term "*Indicator digit*, because it indicates a new basis for division. The zero is always used in the DC as an indicator digit, sometimes for a phase indicator (as when it brings in common subdivisions) and sometimes for a facet indicator (as when it brings in the chronological divisions in history)".

31 TABLE OF CONNECTING SYMBOLS

CC No.	Fundamental Category	UDC No.
.	Time	" "
.	Space	()
:	Energy	— or .0
;	Matter	— or .0
,	Personality	— or .0

Remarks :

1 Time and Space as Fundamental Categories are implied in UDC. It has also provided distinct connecting symbols for them.

2 There is no indication of UDC having distinguished between the Fundamental Categories: Energy, Matter and Personality. It does not seem to have even recognised them. This accounts for its using the same connecting symbols for all of them.

3 CC has, in its edn 4 (1952), consciously recognised the five Fundamental Categories. It sought to provide distinct connecting symbols for them.

4 However, the limitation of the number of punctuation marks available had forced CC to use the same connecting symbol for Time and Space. This is lowering the versatility of its notation. See *Optional facets* (9) of Ranganathan for definition of 'Versatility'.

32 SUGGESTION TO UDC

In FID document F52-63 of 23 July 1952, prepared for the Copenhagen Conference, Mr. Lloyd recommended the abolition of ".0" as a connecting symbol. It is for consideration of the sub-committee appointed to implement this idea, whether instead of abolishing ".0", it may not be retained as connecting symbol for the Fundamental Category Matter. In that case the connecting symbol "—" may be reserved as the connecting symbol for the Fundamental Category Energy alone. This will leave only one problem open *viz.* devising a connecting symbol for the Fundamental Category Personality.

33 SUGGESTION TO CC

In Section 24 of *Optional facets* (17) published in *Abgila* 3, (No. 1), 1953 (March) Mr. B.C. Vickery has suggested the desirability of replacing the single Fundamental Category Energy by several Fundamental Categories such as Property, Action, Reaction and so on. If this suggestion gets eventually accepted, new distinctive connecting symbols will have to be improvised for each of them.

4 Role of Securing Helpful Sequence

41 IDEA PLANE

Subjects belonging to a Basic Class may have facets belonging to any one of the Fundamental Categories only or to any two of them only. .or to all of them. Binomial theorem

indicates that this will yield $31 (-2^5 - 1)$ patterns of faceted subjects arising out of any basic class. In what sequence are these 31 patterns to be arranged. That is the question. In paper I-5, Shri K.D. Puranik has indicated the application of the principle of Decreasing Concreteness to the facet formula, by a consideration of what is desirable in the idea plane.

42 NOTATIONAL PLANE

This needs implementing in the notational plane. It is the role of the ordinal values of the connecting symbols to do this implementation.

43 CC

To do this implementing, Ranganathan has prescribed, in *Optional facets* (1), a definite set of ordinal values to the Connecting Symbols. Arranged in their ascending sequence the Connecting Symbols of CC will fall in the sequence given in the table in section 31.

44 UDC

There is evidence of UDC having thought out the ordinal values of Connecting Symbols in a conscious manner. From the tables D and G in the sub-section Generalities, under section Auxiliary Tables in V 1 Pt 1 of the English edn (1943) of UDC, we have to infer the following ascending sequence of ordinal values :—

Connecting Symbol	Fundamental Category
()	Space
" "	Time
—	Energy, Matter, Personality
·0	Energy, Matter, Personality

The ordinal values implied in this sequence fail to implement the Principle of Increasing Concreteness on the shelf and the

associated Inverse Principle of Decreasing Concreteness in the Facet Formula.

5 Role of Indicating Partial Comprehension

UDC has used the connecting symbols "+" and "/" to indicate partial comprehension of the foci in an array.

51 COLOSSAL NUMBER

But the prohibitively colossal number of possible partial comprehensions has been already indicated by Ranganathan in *Prolegomena to library classification* (Madras Library Association, publication series, 6), 1937, pp 145-148. In fact he has shown that the number of partial comprehensions of n foci is $(2^n - n - 2)$.

52 NO REAL PURPOSE

In the seminar on Canon of Partial Comprehension, Shri R.S. Saxena has shown that no real purpose is served by providing a distinctive number for a multifocal book, indicating all the partially comprehended foci. See *Abgila* 2, 1952, B116.

53 NOTATIONALLY IMPOSSIBLE

Moreover, Ramabhadran's paper *Critique of Udc* (3) published in *Abgila* 2, 1952, 73-7 has shown that it is not possible to give an ordinal value to "+" and "/" without bringing about a conflict between different principles of helpful sequence. In other words provision for partial comprehension is notationally impossible, in any known notational set up.

6 Role of Indicating Phase

61 UDC

Historically UDC did not distinguish between Phase and Facet. It has used the symbol ":" to indicate Phase and Facet indifferently. It also used ".00" for a similar purpose.

No clear analysis of the situation has yet been attempted. It appears to be a matter of drifting.

62 CC

In edn 1 (1938), CC recognised only one phase-relation. It was bias phase. It prescribed "0" as the connecting symbol. In edn 2 (1939), it recognised tool and aspect phase relations. It prescribed ":" as the connecting symbol for both. In *Elements of library classification* (Kaikhushru Taraporevala memorial series in library science, 4) 1945, p 97, Influencing Phase relation was recognised at the suggestion of Mr. P.K. Garde. At that time z8 was suggested as the Connecting Symbol. The recent conjecture in the Library Research Circle of the Indian Library Association is as follows:— Except for the use of ":" for Tool and Aspect Phase relation, "0" should be the only connecting symbol for all phase-relations. There should be a separate schedule of phase relations using lower case letters in the notational plane. Paper 1·9 of T.N. Koranne deals with this.

The phase-relation digit should follow immediately after the connecting symbol "0".

7 Role to Indicate Round and Level

71 ROUND

In paper 1·7, Shri K.A. Isaac has dealt with different Rounds of Fundamental Categories. As he has stated, a Round can be initiated only by an energy focus. There is therefore no necessity for a connecting symbol to distinguish rounds.

72 LEVEL

In paper 1·8, Shri V.S. Moghe has shown that the same Fundamental Category can manifest itself in two or more Levels in one and the same round. The Levels of a Fundamental Category may form a modulated dependent sequence. Then level n , for example, cannot occur unless a focus exists

in each of the earlier levels ($n-1$) ($n-2$), . . . 3, 2, 1. In that case, connecting symbol does not have the responsibility to indicate level. On the other hand, this conjecture in the idea plane may turn out to be wrong. Then, connecting symbol will have to indicate level. Can this be done by using a connecting symbol in vulgar fractional form? The numerator of the fraction may be the connecting symbol appropriate to the fundamental category concerned. The denominator may be the Arabic numeral indicating the level.

8 Unsolved Problems

The main unsolved problems are:

- 1 The designing of different connecting symbols for Time and Space Facets. This is in CC.
- 2 The designing of different unique connecting symbols for Energy, Matter and Personality in UDG.
- 3 The designing of connection symbol capable of showing level, if this becomes necessary.

PAPER 1·7

ROLE OF 'ROUND'

K.A. Isaac

[Defines and illustrates "Round of Fundamental Categories in Facet Formula." Discusses the value of the concept in Depth Classification needed for Documentation. Makes a comparative study of CC and UDG in this respect. Singles out two problems for investigation.]

0 Introduction

The concept of "Round" is of recent origin. It denotes a cyclic recurrence of fundamental categories in the facet-analysis of a subject. It is still developing. In the fourth edition, CC has consciously implemented it for the first time with all its powers evaluated so far. Its effect can be traced even in the earlier editions. But in them it appears to have

been unconscious, primitive and implicit. The purpose of this paper is to assess its value in Depth Classification.

1 Example 1

Consider the subject "Disease of blood of the human body". Retaining only the substantives, the subject gets broken up into the words:

Disease. Blood. Human Body.

11 FUNDAMENTAL CATEGORY

Each of these terms may again be replaced by the Fundamental Category manifesting itself in it. (See paper 1.5 by Shri K.D. Puranik). Then we arrive at the Facets:

[Energy] [Personality] [Personality]

Of these, the second Personality Facet is the Basic Class itself—here Medicine. For brevity in the later part of the paper, it may be replaced by its Colon Number L. For the same reason each Fundamental Category may be replaced by its first letter. Then we get:

[E] [P] [L]

12 SEQUENCE

What should be the Sequence of these facets? L—the Basic Class—should come to the first position. Shri Puranik has prescribed in section 51 of paper 1.5 the sequence of the other two facets as:

[P] [E]

In paper 1.6, Shri S. Ramabhadran has given the Connecting Symbol for each Fundamental Category. Accepting these two prescriptions, the subject gets translated into the Facet Formula:

L [P] : [E]

2 Example 2

Now consider the subject 'Malaria'. This name is elliptical. See Ranganathan (S.R.): *Library classification*,

fundamentals and procedure (Madras Library Association, publication, series, 12), Chap 23. Filling up the ellipsis we get the subject in the expressive form "A disease of the blood of the human body caused by Malarial parasite." Removing the connectives and replacing each substantive by the term occurring in the Schedule of CC, we get:

Disease. Blood. Medicine. Malarial Parasite

21 SEQUENCE

The previous section has shown the sequence of all the Foci except "Malarial parasite". This Focus is a new one. It is a manifestation of Personality. The prescription of Shri Puranik in paper 1.5 does not help us to fix its position because it is a second Personality. But it is obviously dependent for its existence on the Energy Focus "Disease". Hence it should follow "Disease".

211 New Principle

We here enunciate a new principle. A Dependent Focus should follow its Host Focus. Then we get the following Sequence:

L [P] : [E] [P]

22 PROBLEM

Here we come across a new phenomenon bringing with it a problem. We find the Personality Facet repeated. This repeated Personality Facet succeeds the Energy Facet. This is a violation of the Principle of Decreasing Concreteness. See Ranganathan (S.R.): *Philosophy of library classification*. section 251. And yet this is the only sequence helpful in the idea plane. We are thus caught in an impasse.

23 SOLUTION

The concept of 'Round' comes up as a solution to this problem. We regard the above Facet Formula as made up of

two rounds. The first Round has two facets. The second has only one. To emphasise that the second Personality belongs to the second Round it is written as [2P]. On this basis the Facet Formula of the above example will become

$$L [P] : [E] [2P]$$

We further state that the Principle of Decreasing Concreteness holds good only within a single Round.

24 STARTER OF ROUND

It may be noted here that the Second Round succeeds the [E] Facet. This is not an accident.

241 An Analogy

In grammar, only a Transitive-verb can give rise to an object. So here we conjecture that only an Energy Facet can give rise to a new Round. Hence the Round should start after it. There can be an Energy Facet which does not start a Round. It is like an Intransitive Verb which cannot have an object. The transitive or intransitive quality, as it were, of an Energy Facet depends on the particular manifestation it takes.

3 Further Examples

We may now proceed to see the effectiveness of this concept in securing co-extensiveness whatever the intention of the subject. The following table gives examples. Against each example, its Facet Formula is given.

<i>Subject</i>	<i>Facet Formula</i>
1. Treatment of Malaria	$L [P] : [E] [2P] : [2E]$
2. Treatment of Malaria by drug	$L [P] : [E] [2P] : [2E] [3P]$
3. Quinine treatment of Malaria	$L [P] : [E] [2P] : [2E] [3P] ; [3M]$
4. After-effect of Quinine treatment of Malaria	$L [P] : [E] [2P] : [2E] [3P] ; [3M] : [3E]$

<i>Subject</i>	<i>Facet Formula</i>
5. After-effect of Quinine treatment of Malaria on the ear	L [P] : [E] [2P] : [2E] [3P] ; [3M] : [3E] [4P]
6. Treatment of after-effect of Quinine treatment of Malaria on the ear	L [P] : [E] [2P] : [2E] [3P] ; [3M] : [3E] [4P] : [4E]
7. Treatment of after-effect of Quinine treatment of Malaria on the ear, in India	L [P] : [E] [2P] : [2E] [3P] ; [3M] : [3E] : [3E] [4P] : [4E]. [4S]
8. Treatment of after-effect of Quinine treatment of Malaria in the ear, in India in 1950	L [P] : [E] [2P] : [2E] [3P] ; [3M] : [3E] [4P] : [4E]. [4S]. [4T]

These examples illustrate Rounds 1, 2, 3 and 4. The intention of the subject may increase to any degree. The number of Rounds will also correspondingly increase. In all these cases our conjecture, that Energy is the starter of a Round, holds good. In the third Round of the examples from 4 to 8, we have the (P), (M) and (E) Facets occurring.

31 SPACE AND TIME

It may be observed that Space and Time *qua* Space and Time occur at the end of the last Round. This again is not an accident. An *a priori* reason for this may be given thus:

Space and Time are less concrete than Energy. Hence according to the Principle of Decreasing Concreteness, they should follow the Energy Facet. But we have found that a Round can start only after the Energy Facet. Thus, when there are two or more Rounds, it is impossible for [S] and [T] to take position anywhere except at the end of the last Round.

4 Conclusions

The above discussion leads us to the following conclusions:

- 1 A subject may admit of several 'Rounds' of the Fundamental Categories ;

- 2 Energy is the starter of a Round ;
- 3 Space and Time *qua* Space and Time cannot occur in any but the last Round ; and
- 4 The [P], [M] and [E] Facets can occur in all Rounds.

5 Notation

The following table gives the ten examples we have considered with their CC and UDC Numbers :

Serial No.	UDC Number	Subject	CC Number
1.	616.15	Disease of the blood of the human body	L35:4
2.	616.936	Malaria	L35:4261
3.	616.936-085	Treatment of Malaria	L35:4261:6
4.	616.936-085.7	Treatment of Malaria by drug	L35:4261:63
5.	616.936-085.751.2	Quinine treatment of Malaria	L35:4261:63 ; J641
6.	616.936-085.751.2:616	After-effect of Quinine treatment of malaria	L35:4261:63 ; J641:94
7.	616.936-085.751.2:616.28	After-effect of Quinine treatment of malaria on the ear	L35:4261:63 ; J641:94183
8.	616.936-085.751.2:616.28-085	Treatment of after-effect of quinine treatment of malaria on the ear	L35:4261:63 ; J641:94183:6

Serial No.	UDC Number	Subject	CC Number
9.	616.936- 085.751.2 : 616.28-085 (54)	Treatment of after-effect of quinine treatment of malaria on the ear, in India	L35 :4261 :63 ; J641 :94183 : 6.44
10.	616.936- 085.751.2 : 616.28-085 (54) " 1950"	Treatment of after-effect of quinine treatment of malaria on the ear, in India in 1950	L35 :4261 :63 ; J641 :94183 : 6.44.N50

6 Observations

The comparative table of class numbers given in Section 5 suggests some observations:—

- 61 The sequence of the ten subjects is the same in CC and UDC.
- 62 Every CC Number implements fully the findings in the Idea Plane. But the second UDC Number fails to mention the organ Isolate. The result will be that all books on blood and all its diseases will not come together when arranged by UDC. Of course this defect is not brought out by the above table.
- 63 Subject to the persistence of the above mentioned peculiarity, from the third subject onwards all further facets of UDC follow the same sequence as those of CC.
- 64 Each CC Number is fully expressive of all the relevant constituents of each of the subjects. For the reasons given in 62 the UDC Number is not.

- 65 UDC prescribes hyphenated special analytical divisions for the class 616 and its sub-divisions. This must be remembered. The temptation to use colon combination should be avoided.
- 66 The number of digits in a Class Number is not of primary importance. However, a scheme providing a shorter and expressive number to a subject carries a greater recommendation. From this angle alone the following comparative figures are given :—

	No. of Digits in UDC Number	No. of Digits in CC Num- ber
Subject 10 of Section 5 . .	40	31
Average for all the ten subjects of Section 5	20	17

The relative shortness of the CC Number has a greater weightage than the apparent one, because it expresses the Organ while the UDC fails to do so.

- 67 Till Subject 5, UDC number continues to be more or less of the same level as CC Number. But in Subject 6, UDC has to use phase notation to indicate after effects ; while CC uses Second Round of Energy Facet. It is here that UDC loses ground. Its handicap continues thereafter.

7 Unsolved Problems

- 71 In his Paper 1·5, Shri Puranik has referred to the difficulty due to the absence of an objective criterion to determine the Fundamental Category of which a given isolate should be deemed to be a manifestation. This difficulty gets more pronounced with increase in the number of Rounds.

Therefore the need for establishing an objective criterion gets re-inforced as a problem requiring early attention.

- 72 All the work now in progress in the Library Research Circle of the Indian Library Association is based on Energy being the only Fundamental Category capable of starting a Round. This is only a conjecture. But there is always the Sword of Democles hanging over it. If Space or Time *qua* Space or Time can also start a Round, many of the results obtained so far will be nullified. Hence it is all the more necessary to think of an *a priori* method of settling the correctness of the conjecture.

PAPER 1·8

ROLE OF LEVEL

V.S. Moghe

[Assumes definition of 'Level' given in Ranganathan's *Optional facets* (15). Applies the idea to the Main classes Literature, Medicine and Engineering. Probes into the capacity of this concept. Arrives at certain new principles regarding the assemblage of isolates belonging to consecutive 'Levels'. Enumerates problems needing further investigation.]

1 History

Like "Round", "Level" is also a new idea in Depth Classification. It denotes the recurrence of one and the same fundamental category within a "Round". Its conscious implementation is found in CC, edn 4 1952. But it is still in an experimental stage. It needs to be substantiated through *a-priori* reasoning, and experience. Yet its emergence has so far been encouraging.

11 Crisis

But even in CC, edn 4, there is no definition of "Level". There is only a prescription of "Level" in some facet formulae.

It has all been a rule-of-thumb affair. Many inconsistencies were felt. But attempt at a conscious prescription of "Level" brought a crisis in thinking. It all turned upon the idea of "Part". About six months were spent by the Library Research Circle of the Indian Library Association in chasing this idea.

12 SOLUTION

At long last, some light appeared. The result of investigation in this light is given in Ranganathan's *Optional facets* (15) appearing in *Abgila* 3, 1953, 1-8. This paper broke down the idea "Part" into three sub-ideas—Organ, Constituent, and Portion. Of these we are concerned only with the first. An Organ isolate is $(\bar{W})[P]$. The formation of $(\bar{W})[P]$ is now known to be a definite occasion for change of "Level". In spite of the fundamental category "Personality" continuing to manifest itself, we are obliged to change the facet.

2 Law of Parsimony

Section 2 of paper 1-3 of Shri D.B. Krishna Rao has shown that change of level i.e. facet, reduces the number of foci to be enumerated. This no doubt satisfies the Law of Parsimony. But before accepting the solution I should like to examine another possible way in which also the Law of Parsimony can be satisfied.

21 AUTO-BIAS DEVICE

Let us not change the facet. Let us retain the schedule of isolates for "Tooth" as given in the current edition of CC, with the addition and alteration suggested in Section 22 of paper 1-3. We can form any combinations of "Kind of tooth" and "Part of tooth" by Auto-bias device. So far as the number of foci in the schedule is concerned, this method satisfies the Law of Parsimony as effectively as change of facet.

22 ECONOMY AGAIN

But the Law of Parsimony raises another issue. It is made clear by the following table. It gives in parallel columns the isolate numbers for combined foci derived by:

- 1 Audio-bias device ; and
- 2 Facet device implied in change of "Level".

Combined focus	Auto-bias number	Faceted number based on change of "Level"
Root of Milk Tooth	21431-21421	21431,1
Neck of Milk Tooth	21431-21422	21431,2
Root of Canine Tooth	21432-21421	21434,1

In each case the Faceted number got by change of "Level" is shorter by 4 digits than the Auto-bias number. The Law of Parsimony naturally, therefore, prefers the Faceted number to the Auto-bias number.

3 Example 1

The following table gives an analysis of certain subjects in the main class 'Literature'. We shall assume for definiteness that the language of the literature is the favoured one. It may thus be represented by '—'. In each row of the table, line 1 of column 2 gives a subject. Line 2 expands it by filling up ellipses where necessary. Line 3 arranges the substantive terms in line 2 according to the Level-Facets to which they respectively belong. Line 3 of column 1 gives the CC No. with the appropriate connecting symbols. This uses the prescription of CC that after a Form Number, the connecting symbol between Form Facet and Author Facet may be taken as understood. Line 3 of Column 3 gives the UDC Number. Line 4 of each of the three columns gives the facet formula. Row 2 deals similarly with example 2. Row 3 deals with example 3.

CC No.	Subject	UDC No.
0-,2 0[P],[P2]	English Drama English Drama in Literature Literature. English. Drama 0[Language], [Form]	820-2 8[P]—[P2]
0-,2J64 0[P],[P2] [P3]	Shakespeare Shakespeare the dra- matist in English Literature Literature. English. Drama. Shakespeare Language, [Form] [Author]	820 (Shakespeare) 8[P] [P3]
0-,2J64,51	Hamlet A work of Shakespeare The Dramatist in English Literature Literature. English. Drama. Shakespeare.	820 (Shakespeare7) Hamlet
0 [P], [P2] [P3], [P4]	Hamlet 0[Language], [Form] [Author] [Work]	8[P] ([P3] 7) [P4]

Remarks :

11 That "Language" forms [P] has been all along implicitly followed practically in all schemes of classification.

12 As we pass from "Language" to "Form", we pass from (W) to (w̄). The (w̄) in which we land ourselves is neither a "Constituent" nor a "Portion". It can only be regarded as an "Organ", even as the "root of tooth" is an 'Organ of Tooth'. Therefore, "Form" is regarded as [P2].

13 A Similar remark applies also to "Author" being regarded as [P3].

14 So also a similar remark applies to "Work" being regarded as [P4].

2 The omission of " , " between [P2] and [P3] in CC has already been explained.

3 The Group-Notation for individualising a work of an author is prescribed in Rule 041(2) of CC.

4 UDC omits "Form Number" whenever the level of "Author" is reached. This promiscuously mixes up authors belonging to different forms. This is unhelpful.

41 However, there is nothing in UDC, compelling the omission. The "Form-Facet" i.e. [P2] Facet before inserting the Author Facet i.e. (P3)— may be practised.

42 Alphabetical arrangement of the author is not as helpful as chronological arrangement, in the Depth Classification needed for documentation work.

421 Even in arrangement of books in a public library alphabetical arrangement of authors is not essential. But it is falsely believed to be so by some librarians. This belief is unconsciously induced at bottom by inertial resistance to the work needed for chronological arrangement.

5 No doubt there should be common sub-divisions for collection, selection, attributed work, criticism and so on. But the provision of a common sub-division digit for "individual work" is redundant. Mention of the name of the work after the name of author shows by itself that it is only an individual work.

51 Alphabetical arrangement of works is not as helpful as chronological arrangement or any other group-cum-chronological arrangement in Depth Classification needed for documentation work.

6 The close parallelism of the sequence of 'Levels' in CC and UDC is a remarkable confirmation of

- 1 The two schemes making virtually the same approach; and
- 2 This commonness of approach indicating a high probability for the approach to be on helpful lines.

4 Example 2

In literature, the levels of [P] had been properly kept apart. This was, however, unconscious. In Medicine, unconscious flair had failed—in certain places. Let us illustrate with 'Digestive System'.

41 ARRAY OF ORDER 1

Here is an assortment of isolates of the "Digestive System".

CC No.	Isolates	UDC
2	Digestive System	3
21	Mouth	31
22	Pharynx	321
23	Esophagus	329
24	Stomach	33
25	Intestine	34
26	Small	341
27	Large	348
291	Liver	36
293	Pancreas	37

Remarks:

- 1 The sequence is the same in CC and UDC.
- 2 All the isolates from the second row downwards are beyond doubt (\bar{w}) 'Organs.' They form a different level of facet. This is true in the idea plane. Accordingly in the notational plane a connecting symbol should come between

the basic digit 2 for Digestive System and the digit for an Organ. But it has been omitted.

3- This apparent divergence between idea plane and notational plane is, however, justified. In any human body, digestive system is unique. There can, therefore, be no (\bar{w}) (Group) isolate of it. Thus no ambiguity will arise by not marking off (\bar{w}) (Organ) isolates by their own connecting symbol.

4 In CC there is a further divergence between idea plane and notational plane. The two (\bar{w}) 'Organs' of the 'Intestine' have been given numbers co-ordinate with that of their immediate universe. This apparent divergence, however, is in keeping with the usual practice of saving the number of digits in that manner whenever the number of isolates can not exhaust the first octave.

5 UDC does not, however, adopt this practice for it seeks to accommodate "Liver" and "Pancreas" in the First Octave itself. But CC accommodates them in the Second Octave. The reason is this. CC usually specialises an octave for the (\bar{w}) "Organs" formed on the basis of different characteristics. Here the First Octave is reserved for (\bar{w}) 'Organs' reached while proceeding unidirectionally along an axis from end to end. The Second Octave is reserved for (\bar{w}) 'Organ' attached in a direction at right angles to the axis.

42 ARRAY OF ORDER 2

We shall now take a typical Array of Order 2. Here is an assortment of isolates of "4 Stomach".

CC No	Isolates	CC No.	Isolate	UDC No.
45	Secretion	48	Orifice	
46	Gland	481	Cardiac	
461	Cardic	482	Pyloric	34
463	Pyloric	4828	Valves	

Remarks :

11 It is clear that the First Order Array is a "Mixed array" as defined in paper 1·3 of Shri D.B. Krishna Rao. Two regions of stomach are mentioned—Cardiac and Pyloric. Each is a (\bar{W}) 'Organ' isolate of the first remove from "Stomach."

12 Associated with each of these isolates, there are three (\bar{W}) "Organs" viz. Orifice, Valve, Gland and Secretion. These are of the second remove from "Stomach."

2 The Law of Parsimony requires, that these two sets of isolates being enumerated in separate schedules of their own.

3 Taking stomach as belonging to [P2] i.e. Second Level Personality Facet, we should really provide for the following two separate schedules :

Isolates of [P3]	Isolates of (P4)
1 Cardiac	3 Orifice
2 Pyloric	4 Valve
	5 Gland
	6 Secretion

With the enumeration of six isolates, we get the benefit of the enumeration of $2+3+4+8=14$ isolates. This certainly satisfies the Law of Parsimony.

4 There is only one stomach in each body. It is not therefore necessary to insert the connection symbol ' , ' between [P2] and [P3].

5 This gives an additional advantage. A compound isolate like glands of stomach can be represented conveniently by 2,4.

6 UDC has not provided for such depth divisions. It cannot be argued that secretion can be accommodated in

'Physiology'. Physiology can only take care of the act of secretion. What is secreted should go only under "Anatomy", as a (\bar{W}) "Organ".

7 A full-fledged facet formula with several levels of [P] is illustrated by the following:

CC No.	Subject	UDC No.
L242 :2	Anatomy of the pyloric region of the stomach Medicine. Digestive system. Stomach. Pyloric region. Anatomy. L[P][P2][P3] : [E]	611.334
L242,4 :2	Anatomy of the pyloric valve in the stomach Medicine. Digestive system. Stomach. Pyloric region. Valve. Anatomy. L[P][P2][P3],[P4] : [E]	

8 Probably, we can generalise as follows:

Whenever an isolate in a [P] level is unique and does not admit of further (W) sub-isolates, a connecting symbol need not be inserted between it and the isolates in the next [P] level corresponding to (\bar{W}) 'Organ' [P].

5 Example 3

Some further features in the treatment of (W)[P] and (\bar{W})[P] in the notational plane emerge in "Engineering". We shall take "Bicycle" as the universe of study. We shall denote it by the CC No. 'D5132' and the UDC No. '629.118.3'. The CC No. is different from the one given in edn 4. It is taken from the following schedule being evolved, for edn 5, to secure better grouping:

CC No.	Isolate	UDC NO.
5	Vehicle	1
51	Land	11
511	Wheel-less	111
512	Moved by animal power	112
513	Moved by human muscular power	
5131	Monocycle	118.2
5132	Bicycle	118.3
etc.	etc.	etc.

(W) universe of bicycles can be grouped on the basis of two characteristics :

1 User ; and 2 Maker.

There are only these two possible groupings. In any case there is not likely to be a sufficient number of groupings to justify making the first order array consist solely of characteristic numbers. Therefore, the following table is formed :

CC No.	Isolate	UDC No.	CC No.	Isolate
By user			By maker	
1	Child	031.35	H	Hercules
2	Adolescent		HJ	Hind
3	Adult		R	Raleigh
4	Man		S	Sunbeam
5	Lady			

Remarks :

1 The isolate numbers based on 'User' are got by Mnemonic Device. They occupy the first octave.

2 The isolate numbers based on 'Maker' can be got by Chronological or Alphabetical Device. Chronological arran-

gement does not give any special advantage. Therefore, the simpler alphabetical arrangement is preferred. These numbers, therefore, occupy the last octave.

3 Perhaps, literature will be more on divisions based on 'user' than those based on 'maker'. If so, the 'user' divisions having precedence over 'maker' divisions will add to helpfulness of sequence.

4 Combinations of 'user' and 'maker' should, of course, be got by Auto-bias Device. *Example 5*—S Lady Sun-beam

52 (\bar{w})[P2]

We shall next consider the division of a 'Bicycle' by 'Organ'. The following schedule will be used:

CC No.	Isolate	UDC No.	CC No.	Isolate
--------	---------	---------	--------	---------

1	Regional	5	Steering system
11	Stand	6	Seat
12	Frame	8	Hood
192	Joint		Auxiliary
	By Function	92	Brake
2	Gear system	93	Bell
3	Axle	95	Light
4	Wheel	98	Carrier

Remarks:

1 The CC numbers follow the "Unscheduled Mnemonics" implied in the schedule of (\bar{w}) [P] divisions of 'Medicine'.

2 Auxiliary attachments are accommodated in the second octave.

3 The M. Lib. Sc. class of the university of Delhi had been for long struggling to establish a general principle for the

enumeration of the isolates of the First Order Array as we land on a (\bar{W}) 'Organ' [P] level. The above enumeration is based on the latest prevailing ideas.

53(\bar{W})[P3]

We shall demonstrate the formation of [P3] for the [P2] focus "Wheel". In this case, it is not easy to distinguish between regional and functional organs. Therefore, we may enumerate the organs by the Principle of Spacial Contiguity. We shall begin with the bottom and move upwards. We then get the following schedule:—

CC No.	Isolate	UDC No.
1	Tyre system	
2	Rim	
3	Spoke-system	
4	Hub	

54(\bar{W})[P4]

We shall demonstrate the formation of [P4] for the [P3] focus "Tyre system". We shall adopt the following schedule:—

CC No.	Isolate	UDC No.
1	Tyre	
2	Tube	
3	Air	
4	Tape	

We can reach even higher 'Levels' of [P]. These 'Levels' will not of course be in demand for arranging books on shelves. But they will be necessary for documentation work.

6 Results Obtained

The results obtained so far in the Library Research Circle may now be brought together by:

1 An illustrative assorted list of subjects with their class numbers ; and

2 A collection of the general principles arrived at.

61 ILLUSTRATIVE LIST

It may perhaps be useful to give a few subjects manifesting different 'Levels' of 'Personality'. We shall take 'Bicycle' as the universe. In a library specialising in Bicycles, its CC No. "D5132" may be replaced by "—", the symbol for favoured subject. Here is a list of illustrative subjects:

CC No.	Subject	UDC No.
—:4	Defect in bicycle	
—,41,1,3:C2:7	Pressure of air inside the front wheel tyre of a bicycle	
—4:4	Defect in men-bicycle	
—4-R:4	Defect in 'Raleigh' men-bicycle	
—,4-R,4:4	Defect in wheel of 'Raleigh' men-bicycle	
—4-R,4,1,2D;F52:4	Defect in plastic 'Dupont' tube in 'Raleigh' men-bicycle	
—,4-R,4,13-F;J718		
	:4 Defect in 'Firestone' pneumatic rubber tyre in 'Raleigh' men-bicycle	
—R:4	Defect in 'Raleigh' bicycle	

Remarks:

1 'Material' numbers are constructed by crude Subject Device. The Library Research Circle of the Indian Library Association has found this to be exposed to the fault of homonym. It has a project to eliminate this defect. It will be taken up when isolates in [M] are taken up for study.

62 SOME PRINCIPLES

Here is a list of findings and recently established principles. The list also includes some new principles.

1 In *Optional facets* (15), Ranganathan has established a criterion for the formation of a new array within a [P] or a new Level [P]. He has recommended the former when the resulting isolates are (W)[P]. He has also recommended the latter when the resulting isolates are (\bar{W}) [P] 'Organs'. This criterion appears to lead to helpful arrangement.

2 The connecting Symbol between $[P_n]$ and $[P_{(n+1)}]$ may be omitted and taken as understood if $[P_n]$ contains one and only one isolate, and, therefore, no (W)[P] isolate of a lower order is possible.

3 The sequence of isolates in a (\bar{W})[P] Array may be based on *Unscheduled Mnemonics*. This is pursued further in Paper 1-10 by Shri P.N. Kaula.

4 If *Unscheduled Mnemonics* can be established as indicated in 3 above, individualisation can be carried to a considerable extent without restricting the autonomy of the classifier.

5 The examples show that UDC drops out from attempting co-extensiveness.

6 But the unconscious approach of UDC is along same lines as the conscious approach of CC.

7 Therefore, most of the findings and principles given above can be drafted into UDC without much of difficulty.

7 Unsolved Problems

The following problems to be solved are brought to surface:

1 The schedule of each [P] facet of each basic class of CC should be critically re-examined. Each 'Mixed Array'

should be spotted out. It should be rendered pure by the formation of a new 'Level' facet to accommodate (W) "Organ" isolates.

2 The findings and principles have been based on the study of [P]. Are these peculiar to [P]? Or are they applicable to [M]? This requires investigation.

3 The findings are based upon the assumption that $[P(n+1)]$ is dependent upon the occurrence of $[Pn]$. Is this assumption true?

4 The idea of 'Signature Digit' was developed by Ranganathan in his earlier articles on Optional Facets on the assumption that 'Levels' will not form a sequence of dependent ones.

5 Whether there is need for pursuit of idea of 'Signature Digit' needs investigation.

6 When (W)[P] universe is made of objects or concrete entities, implementing the findings in section 6 is easy. When (W)[P] universe is made of attributes or abstract entities, new techniques may have to be employed to enumerate organs in successive Levels with due respect to Canon of Modulation. This needs investigation.

7 Even otherwise there are obscure elements involved in the Canon of Modulation. In the M. Lib. Sc. class of the University of Delhi, Shri S. Ramabhadran has made a suggestion. A modulated Level at any state is determined by what he calls "resolving power", appropriate for that stage. Perhaps a fuller exploitation of this idea will yield useful results.

PAPER 1·9

ROLE OF PHASE

T.N. Koranne

[Traces the history of phased-notation. Mentions the recent trend to make an independent schedule of phase-relations using lower case letters for isolate numbers. Shows that the phased-notation increases the versatility of the notation of a scheme of classification and the autonomy of the classifier. The advantages demonstrated by CC are worth adoption by UDC.]

1 Definition

We take the following definitions from Ranganathan's *Optional facets* (9) in *Annals* of the Indian Library Association forming part of the *Abgila*, 2, 1952, 173-200.

Complex focus $\mathbb{D}f$ (Two or more classes)

Phase $\mathbb{D}\mathbb{E}$ (Classes forming a complex focus)

These definitions have been repeated in CC, edn 4 (1952)

2 Phases

21 TWO PHASES

Examples

No.	Subject	Phase 1	Phase 2	Relation
1	Economics for mathematicians	Economics	Mathematics	Bias
2	Mathematical economics	Economics	Mathematics	Tool
3	Influence of mathematics on economics	Economics	Mathematics	Influence
4	Economics and Mathematics compared	Economics	Mathematics	Comparison
5	Relation of Economics with mathematics	Economics	Mathematics	General relation

Remarks :

1 The status of each of the above five subjects is that of a complex focus.

2 This is merely a consequence of the subjects included in the schedule of main classes in a scheme.

3 Each of the above five subjects have two phases.

4 The above five examples represent four possible phase relations,

3 Notational Plane

The construction of a Class Number of a Complex Focus reduces itself to :—

- 1 Translating each phase into its own Class Number
- 2 Linking up the two Class Numbers by a suitable connecting symbol.

31 CONNECTING SYMBOL

In CC “ : ” (colon) is used as a connecting symbol for tool relation. For all other phase relations the connecting symbol is “ 0 ” (zero). But the remaining number of phase relations in the table of Section 2, needed to be individualised, is four. Are we to have four different connecting symbols ?

32 HISTORY

Historically, it was the bias relation that was first recognised. “ 0 ” (zero) was used as connecting symbol for that relation. In 1942 “ Influence Relation ” was recognised. This is described in Ranganathan's *Elements of library classification* (Kaikhushru Taraporevala Memorial Series in Library Science, 4), 95-98. At that time the prevalent feeling was that each phase relation should have a distinctive connecting symbol. Accordingly the connecting symbol used was “ z 8 ”. In 1949 “ Comparison Relation ” was studied in Koranne's *Phase relation : Special vs. general principles* in *Annals of the Indian Library Association* forming part of the *Abgila*, 1, 1949, 37-39. At that time the connecting symbol used was “ .e ”.

33 TWO-DIGITED CONNECTING SYMBOL

Limitations of the digits available for use as connectives led to the adoption of two digits for a connecting symbol. Recently the following suggestion arose in the Library Research Circle of the Indian Library Association :

1 Make " : " (Colon) as a connecting symbol for Tool/Aspect Relation

2 Make " 0 " (Zero) the connecting symbol for all other relations.

3 Make a schedule of all possible phase-relations. Represent each relation by a lower case letter.

4 Bias relation alone may be left without any digit to represent it. The result will be:

The bare " 0 " (Zero) between two phases indicates Bias relation.

All phase-relations other than Tool/Aspect and Bias will be indicated by the occurrence of a lower case letter immediately after the connecting symbol " 0 " (Zero)

33 SCHEDULE OF PHASE RELATIONS

The following schedule of Phase-relations is implied in Sections 824 to 826 of CC, edn 4 (1952)

Phase Relation Number	Phase Relation
<i>c</i>	Comparison
<i>d</i>	Influence
<i>f</i>	Others

34 Examples

Using the above schedule, we get the following Class Numbers for the five subjects of the Section 2.

No.	CC	Subjects	UDC
1	XOB	Economics for mathematicians	33:51
2	XO <i>c</i> B	Economics and mathematics compared	33:51
3	XO <i>d</i> B	Influence of mathematics on economics	33:51
4	XO <i>f</i> B	Relation of Economics with mathematics	33:51
5	X:B	Mathematical economics	33:51

4 Implied Assumptions

In subjects 1 and 5 mentioned above there is no difficulty in regarding economics as Phase one.

In subjects 2 and 4, the Phase-relations—Comparison and General relation—are reciprocal. There is no criterion therefore to fix the order of the phases. In such a situation Koranne in his paper *Phase relation : Special vs general principles* has suggested that the convention, of making that subject, the first phase, whose main class occurs earlier in the schedule of main classes, should be adopted.

According to this convention, the class number of these subjects will then be BOcX and BO/X respectively.

Phase-relation of subject 3, presents a new difficulty. It does not belong to either class mentioned above. "Economics is influenced by mathematics" implies "Mathematics influences Economics". Can it be asserted that the content—rather the development of the content—will be the same in both these cases? If so, there is no difficulty. In *Phase relation : special vs general principles* Koranne has suggested that the influencer should be Phase Two. That may be adopted as a convention. If not so, we must recognise another phase relation "Influencing". This may be denoted by "e" in the schedule of Phase relations.

5 Three or More Phases

There are subjects of more than two phases. Here are some examples.

CC	Subject	UDC
G:C:B	Mathematical bio-Physics	57:53:51
G:C:BOL	Mathematical bio-physics for doctors	57:53:51:64
Y:5:B280X	Statistical study of population for economists	312:311:33

More examples will be found in Ranganathan's *Library classification: Fundamentals and procedure* (Madras Library Association, publication series, 12).

6 Advantage of Phased Notation

The phased notation increases the capacity of the given notational system to individualise subjects. In fact, it increases its versatility. Without it the number of main classes will have to be increased. When a particular phase-bond recurs often and becomes the cause of investigation the time may come for recognising it as a main class. But this will happen only in a few cases. The phased notation also brings out the nature of relation between two self contained regions which are only loosely assembled. It increases the autonomy of the classifier.

7 Future

The future work in connection with Phases will be:

- 1 To recognise new phase relations; and
- 2 find a phase relation number to represent them.

PAPER 1·10

ROLE OF MNEMONICS

P. N. Kaula

[Traces the history of the idea and the implementing of Unscheduled Mnemonics. Shows its role to be increase of the autonomy of the classifier. Singles out problems awaiting investigation.]

1 Introduction

The use of Mnemonics in classification was first described by Mr. W.C. Berwick Sayers in his *Manual of classification*, 1926, p. 96. It is the representation of the same idea by the same digit or number in all its occurrences. This concept was extended by Dr. S.R. Ranganathan in his *Prolegomena to library classification* (Madras Library Association, publication series, 6), 1937, P 120-34. This extension is further elucidated in his

Philosophy of library classification (University Library, Copenhagen, Library research monographs, (2), 1951, P 67-76).

Two types of mnemonics have been recognised : Scheduled and Unscheduled.

1 Scheduled Mnemonics

In P 121 of the *Prolegomena*, Scheduled Mnemonics is defined thus :

“By Scheduled Mnemonics is meant the Mnemonics that are secured by preparing, as a preliminary measure, certain schedules of classes, which may recur as subdivisions of several classes or by referring all recurrent subdivisions of a given type to the one schedule of those subdivisions which is given in a most convenient and appropriate place in the scheme.”

In DC(=Decimal Classification) Geographical, Language and Form divisions provide for this type of Mnemonics.

To these, UDC (=Universal Decimal Classification) adds also Auxiliary Tables on Race, Nationality, Time and Point of View. It also provides under certain classes Special Analytical Divisions applicable to all their respective subclasses.

SC (=Subject Classification) also has got Geographical and Language divisions besides the Categorical Tables, for this purpose.

LC (=Library of Congress Classification) does not provide such auxiliary schedules. In it the same isolate term is represented by different numbers at different places.

In CC (=Colon Classification) auxiliary tables are provided for common subdivisions and Geographical, Language and Chronological divisions. In addition, the schedules for the different facets of a Basic Class also amount to Scheduled Mnemonics.

2 Unscheduled Mnemonics

CC is practically the first scheme to base itself on the concept of Unscheduled Mnemonics. The following are some examples.

21 OBVIOUS CASES

CC Number	Isolate term	UDC Number
G:4	Disease of living organism	576·8
I:4	Plant pathology	581·2
J:4	Crop disease	632
K:4	Pathology of animal kingdom	591·2
λ:4	Veterinary Disease	636·089
L:4	Disease of human body	616
Y:4	Social pathology	

From the examples it is clear that CC uses digit "4" as mnemonic for Disease in all the subjects. There is no such Mnemonic use in UDC.

22 LESS OBVIOUS CASES

CC No.	Isolate term	UDC No.
<i>Group 1</i>		
G:3	Physiology of living organism	576·2
I:3	Physiology of plants	581·1
K:3	Physiology of animal kingdom	591·1
λ:3	Veterinary Physiology	
L:3	Physiology of human body	612
<i>Group 2</i>		
B13:3	Analytical method in Theory of Numbers	511·292
B3	Analysis	517
E:3	Analytical Chemistry	543

CC No.	Isolate term	UDC Number
<i>Group 3</i>		
Δ:3	Technique of mysticism	141·33
T:3	Teaching technique	371·3
<i>Group 4</i>		
V:23	Legislature	328
V:3	Function	
W:3	Function	354
<i>Group 5</i>		
D66:3	Transformation of electricity	621·317·611
P:3	Syntax	415
Q:3	Theology	21
X:3	Distribution	339·2
Y:3	Social activity	362
Z:3	Contract	347·4
Z:93	Interpretation	340·43

A study of these examples discloses a deeper mnemonics pervading CC numbers. The digit "3" is used as mnemonic for Physiology, Analysis, Technique, Function, Transformation, Propagation method, Syntax, Theology, Legislature, Distribution, Activities, Contract and Interpretation. These are all analogues or parallels in the idea plane. They are therefore denoted by the same digit in the notational plane.

23 COMMON-ROOT

In the idea plane, "function" and its analogues are easily seen to stem from a common-root. No doubt, in the verbal plane of natural language, the term used to denote this

root-idea is not the same in all the subjects. On the other hand, the term varies with the subject in which it manifests itself as an isolate. On the other hand, in the notational plane, the root-idea is denoted by the same digit irrespective of the subject in which it manifests itself as an isolate. This phenomenon is denoted by Dr. Ranganathan by the term "Unscheduled Mnemonics".

24 OTHER COMMON-ROOTS

In a similar way, each Arabic numeral is made to denote some common root-idea. This happens inspite of the term in the verbal plane not being the same in all the subjects. This is explained in the *Philosophy* and in the *Prolegomena*. I may add the following:

1 is the digit in the notational plane for the analogues :
Fundamentals, Preliminary, Nomenclature, and
Person, in the idea plane

8 is the digit in the notational plane for the analogues :
Management, Organisation, Testing, and Equipment,
in the idea plane

To the analogues in the idea plane denoted by digit 2,
the following may be added: Constitution

To the analogues in the idea plane denoted by digit 4,
the following may be added: Fault

To the analogues in the idea plane denoted by digit 5,
the following may be added: Control, and Beauty

To the analogues in the idea plane denoted by digit 6,
the following may be added: Relief, and Movement

To the analogues in the idea plane denoted by digit 7,
the following may be added: Growth, and Produce

There is no recorded schedule for these isolate numbers and so they cannot be applied mechanically as in Scheduled Mnemonics. Personal discussion and initiation are still necessary to apply it properly.

25 ORIGINAL DEFINITION

The concept of Unscheduled Mnemonics was published by Dr. Ranganathan after he had published the first edition of CC. It came to light in his objective comparative study of DC, EC, SC and CC, embodied in the *Prolegomena*. In P 121, he gave a provisional definition as follows:

"By Unscheduled Mnemonics is meant Mnemonics that are secured by adopting certain conventions with regard to the different possible significances of some of the digits in use".

In their *Fundamentals of library classification* (Practical library handbooks, 12), 1951, P 80, Messrs. B.I. Palmer and A.J. Wells call it "Seminal mnemonics". This is no doubt a more expressive term.

3 Fundamental Categories

In papers 1-5 and 1-6 of Shri K.D. Puranik and Shri S. Ramabhadran respectively, an analytico-synthetic scheme has been shown to acquire great versatility if based on the five fundamental categories—Time, Space, Energy, Matter and Personality. Of these the schedules for Time and Space manifestations yield only Scheduled Mnemonics. Energy, Matter, and Personality yield also Unscheduled Mnemonics. With proper attunement and discipline, the use of Unscheduled Mnemonics will increase the autonomy of the classifier. That is the role of Mnemonics in Depth Classification.

4 Numeral Digits

So far, Unscheduled Mnemonics are being handled consciously only for Arabic numeral digits. These were unconsciously occurring even in edn 1 (1933) of CC. An inductive study carried out in the *Prolegomena* (1937) led to their recognition. The later edns of CC are implementing the idea more and more thoroughly.

5 Energy Facet

Even these are more pervasive in Energy facet than in [M] or [P]. The limitation, of the base of the Arabic numerals to eight, causes some difficulty. More than one analogue of the same root-idea may occur in the same array. This is now met by taking them to different octaves and making the significant digit the correct mnemonic digit. An example is given in paper 1.19, section 11. This belongs to [P]. However the principle involved is the same. There "5" in the first octave is used for "Subscription Library". Therefore "95", the corresponding number in the second octave is used for "Contact Library".

6 Matter Facet

Very little has been done to arrive at mnemonics for Matter facets. Some are being experimented upon. The digit "1" for "Basic Substance" and the digit "4" for "Alloy" are examples.

7 Personality Facet

The digits in the Personality facet yield Scheduled Mnemonics whenever the principle of Spatial Contiguity or Evolutionary Sequence is used to arrange the isolates in an array.

Examples will be found in [P] of Agriculture, Zoology, Medicine and Education.

8 Letter Digits

No progress has been made in arriving at Unscheduled Mnemonics for letter-digits. Dr. Ranganathan is investigating the possibility of arriving at them with the aid of the *Tantric* tradition of India. Of course, to utilise this tradition, the letters have first to be converted into Devnagri script. This conversion has already been done provisionally. The conversion table is given in P 201 of *Library manual* by S.R. Ranganathan and

K.M. Sivaraman (Indian Library Association, English series, 3), 1951.

81 UNIVERSAL LANGUAGE

The passage from Dr. Warren Weaver quoted in section 521 of Paper 1·5 of Shri K.D. Puranik speaks of the "the real but as yet undiscovered universal language". If the unscheduled mnemonics are fully set up, we shall have indeed a close approximation to such a universal language.

9 Unsolved Problems

The following are some problems awaiting investigation :

- 1 Avoidance of the scattering of the analogues of the same root-idea into different octaves. No doubt this is now justified by the accommodation of analogues with decreasing amount of literature in the later octaves. But this is only a paliative.
- 2 The discovery and adoption of mnemonics for letter-digits. The true *Tantric* tradition has not yet been ascertained. However, the clue to search in that direction was got by the following remark of a realised soul, made to Dr. Ranganathan

The Unscheduled Mnemonic use of Arabic numerals was in fair conformity to a tradition of ancient India and Chaldea.

- 3 The common sub-divisions beginning with lower case letters were given as a single schedule in editions 1·3 of CC. But in edition 4 of 1952, it has been broken up into several schedules. This again calls for the discovery and use of Unscheduled Mnemonics for lower case letters.

ROLE OF MIXED NOTATION

PAPER 1-11

ROLE OF MIXED NOTATION

D.B. Krishna Rao

[Defines Digits, Species of Digits, Pure Notation, and Mixed Notation. Traces the evolution of Mixed Notation to the emergence of micro thought in myriads. Gives the history of the evolution of Mixed Notation. Shows the higher mnemonic potentiality, the formation of specialised zones in all arrays and the consequent increase of versatility possible in a Mixed Notation. Deals also with the advantage of making the first order array of main classes have a mixed notation.]

0 Introduction

Any consideration of the 'role of mixed notation' has obviously to stem from the role of notation, *i.e.*, what and why of notation in classification.

1 Notation

Notation is a system of written symbols. The symbols have defined ordinal values. They are designed

- 1 for symbolic representation of classes of knowledge ;
- 2 to fix the position of any one class in relation to the others ; and
- 3 to mechanise the process of sorting and arranging of books on shelves or entries in catalogues or bibliographies, in a more or less helpful preferred sequence.

II INTEGRAL AND DECIMAL

Each primary symbol of a notation is called a Digit. A digit by itself or a combination of them may be a Number. It is used to denote a class or an isolate. It is accordingly called Class Number or Isolate Number.

The addition of a digit at the right end may change the place value of all the existing digits. If so, the notation is

integral. It may not change the place value. Then, the notation is decimal fractional.

Illustrative Table

<i>Integral</i>		<i>Decimal fractional</i>	
Number	Place value	Number	Place value
6	Six	. 6	six-tenth
6 8	Sixty	. 6 8	"
6 84	Six hundred	. 6 84	"
6 848	Six thousand	. 6 848	"

12 PURE AND MIXED

All the digits of a single conventional group are said to belong to one species.

Illustrative Table

Digits				Name of species
1	2	3	9 ..	Arabic numerals
A	B	C	Z ..	Roman capital letters
a	b	c	z ..	Lower case letters
(Digits in the alphabet of each script)				(Name of respective script)
"				Punctuation marks

The punctuation marks may be taken along with arrows, quotation marks, brackets, mathematical symbols and other improvised symbols to form a still another species. We may

call them oddments. A notation using only one species of digits is Pure. A notation using two or more species is Mixed.

2 Early Period

The notation of a scheme of classification has two functions as follows: It has to represent, by a single digit or a combination of digits, every possible class of the Universe of Knowledge. This amounts to a symbolic translation of the name of the class. The call numbers of classification thus form an artificial language.

21 STAGE 1

Till recent years the libraries had to organise and individualise only books embodying macro-thought. Pure Notation as in DC was able to play this role fairly well.

22 STAGE 2

With advances in research, and growth of knowledge books, bulletins and articles were written on specialised divisions of knowledge from special points of view. For the publication of such highly specialised micro-thought, a new type of medium—the periodicals—came into being. Micro-thought of all degrees of minuteness were embodied in articles contained in them. The continuous pressure of these soon revealed that a finite set of symbols had to function in representing and mechanising the arrangement of an infinity of evergrowing units of thought, and every conceivable combination of them. In short the notation had to function not only for book arrangement but also for documentation work.

23 BREAK DOWN

Pure notation began to crack under the pressure of the continuous onslaught of new micro thought ever emerging in myriads. Their exact and expeditious communication among all those engaged in their development or application became increasingly difficult with a pure notation. The

difficulty was intensified in another way. Industrial houses found the need to establish departments of research—pure and applied—as auxiliaries. During the last thirty years several industries have done so. An industry is a profit-making concern. Efficiency is of its very essence. Promptness and accuracy in communication of new thought are imperative in an industrial library. Such a communication had necessarily to depend upon notation. Pure notation began to crumble.

24 CRISIS

We are now in the midst of this crisis. The Royal Society arranged for a conference at London in 1948 to bring this crisis home to the attention of the library profession. In the same year its auxiliary, the Society for Visiting Scientists and the Aslib jointly invited Dr. Ranganathan to speak on this crisis. Accordingly he gave a talk on 29 September 1948. This is recorded in the *Journal of documentation*, 4, 1949, 223-244. His answer to the challenge of micro thought was a Mixed Notation.

3 Mixed Notation

In the idea plane, the various features in the development and structure of the universe of knowledge get resolved into different groups. Mixed notation is able to offer different species of digits to take charge of different groups of features. The very look of a digit and the consequent suggestion of the species to which it belongs induce in the mind, by a strong process of association, the correct group of features. This makes communication more efficient. This helps the picking up of just the relevant factors out of the many communicated. This facilitates work in the idea plane. It is able to keep steps with the march of micro thought. It becomes possible to relate all the different requirements to their bases and allot to each species of the mixed notation a fitting and characteristic role for which it could really do justice.

31 MNEMONIC POTENTIALITY

In a pure notation with a small base, the mnemonic pressure of ideas is too much for each digit to bear. No doubt it can be lightened by increasing the base of pure notation. But we do not have a convenient pure notation with a wide enough base. Therefore we are obliged to have recourse to two or more bases. A Mixed Notation increases mnemonic potentiality.

32 EASE OF USE

Again micro thought requires a long string of digits in its class number. The monotony of it is tiresome to the eye. But a mixed notation breaks the Class Number into segments. Each segment is usually small enough to be taken with comfort in one sweep of the eye. The corresponding thought in the idea plane also is simple enough to be taken into the mind with the segment of the number concerned. In other words specialisation of different species of digits for different roles helps the simultaneous picking up of a segment by the eye and the comprehension by the mind of the thought represented by it. The mechanical reading and the mental grasping of the meaning synchronise, even as the sound and the visible picture do in a talkie. The spontaniety of the association of these two sensory and mental processes is a valuable quality in a Mixed Notation.

4 DC

DC (=Decimal Classification) began with a pure notation. This was but natural. For, at the time of its invention macro thought only came within the purview of classification. Only books had to be arranged on shelves. However, other schemes soon preferred Mixed Notation. This had an effect on DC. In their *Fundamentals of library classification* (Practical library handbooks, 12), 1951, P 63, Messrs. Palmer and Wells remark "Even the DC, the classic exponent of purity in notation

succumbed to this tendency in its thirteenth edition and provided for the permissive use of letters as phase introducers: for example, *d*—language, *f*—form, *k*—time, *p*—place, etc.

5 UDC

UDC was the first scheme to go in for Mixed Notation in a conscious and deliberate way. It added the capital letters of Roman Alphabet to the ten Arabic Numerals of DC. Indeed it admitted whole words into the scheme as in individualising a periodical by adding its name after the number for periodical, individualising a literary author by adding the name of the author after the form number, and adding the name of the biographer after 92, the number for biography. It also introduced a large set of oddments as connecting symbols. This is a bold step taken by UDC to effect the depth classification needed to meet the requirements of documentation work.

6 CC

The CC went a step further. To Arabic numerals and Roman capitals it added also Roman lower case letters. It had also its own oddments of connecting symbols. Further it specialised the three species in the representation of defined classes of categories. For example, capitals are used for Main Classes and Time Isolates. They are also used for alphabetical device; lower case letters are used to represent common isolates and phase relations. Arabic numerals are used to represent special isolates in personality, matter and energy facets and all isolates in space facet.

7 Zone Formation in An Array

The specialised use of species of digits mentioned above has resulted in the formation of easily recognisable zones in an array. The potentiality of this phenomenon is being exploited consciously by the Library Research Circle of the Indian Library Association, only during the last few months. This zone formation—pre-first octave, first octaves and last octaves,

with sub-zones of the latter two—has brought to notice the new and powerful concept of "versatility of notation". This is described in Ranganathan's *Optional facets* (9). The pursuit of versatility has led to a re-examination of the connecting symbols. This has been dealt with in paper 1.6 by Shri S. Ramabhadran.

8 Main Class Array Grows

The array of main classes accepted at any time as helpful depends upon the state of the universe of knowledge at the time. As this universe grows, the structure of each main class gets more complex. Occasionally it gets sufficiently complex to justify its being replaced by two or more main classes. No doubt this has been taking place only at long intervals of time. Aristotle's three main classes gave rise to Bacon's four after a millennium. Bacon's four were replaced by DC's ten a few centuries later. A few decades later DC's ten were replaced by CC's 26 main classes. In edn 4 CC felt justified in making Animal Husbandry an independent main class, to match agriculture as an independent main class. In edn 2 it had already felt the need to recognise mystic experience as an independent main class. These two new main classes had no Roman capital letter to represent them. Purity of notation at least in the array of main classes would have demanded the abandonment of the base of Roman capitals. Some other longer base should have been adopted. This is too violent a change in the notational plane. CC avoided the violent change by boldly admitting Mixed Notation within the first order array of Main classes. It uses appropriate Greek letters to represent the new main classes. Of course each Greek letter was given a definite ordinal value. Perhaps this is more satisfactory to the Law of Parsimony than the wholesale change of the digits for the very main classes.

81 CLASSES OF PARTIAL COMPREHENSION

In its edn 4, CC has boldly introduced Mixed Notation in the first order array of main classes for another purpose. Often

books appear comprehending two or more related main classes. Certain combinations of them are recurrent. This is explained also in paper 1.18 of Dr. Ranganathan. The following are examples:—

CC No.	Generalia Main Classes
A	Science General
β	Mathematical Sciences
τ	Physical Sciences
μ	Humanities and Social Sciences
ν	Humanities
Σ	Social Sciences

The existence of literature—periodicals as well as books—calling for these partial comprehensions of main classes will be easily conceded. It may be remarked here that the interpolation of the new species of Greek letters into the old species of Roman capitals causes Mixed Notation in the notational plane. In the idea plane arrays of two different orders are super-imposed. In other words the array of main classes has become a Super-Imposed Array. Incidentally this satisfies the Law of Parsimony.

91 Problems to be Solved

The following are some of the problems requiring investigation:

- 1 The optimum number of digits for convenient use in Connecting Symbols
- 2 The species of digits to be taken with punctuation marks to increase the digit for Connecting Symbols
- 3 Examination of the need for more zones in an array than the three present

- 4 Notational means for forming additional zones in an array
- 5 The possibility and the need for having an octavising digit in each species of substantive digits.

PAPER 1·12

ROLE OF CHAIN PROCEDURE

T.N. Koranne

[Illustrates the use of chain procedure in arriving at Subject Headings or Class Index Headings. Mentions among its achievements (1) Mechanisation of their choice and rendering, (2) Help to a reader who may bring up any isolate in his subject as the starting point, and (3) Symbiosis between classification and cataloguing.]

1 Subject headings

The help of Chain Procedure is taken to derive subject headings. Subjects headings are derived from class number. The rules for deriving class index entries—subject headings—in a classified catalogue are given in Ranganathan's *Ccc* (*Classified catalogue code*) edn 3, 1951. The rules for deriving subject headings (Specific as well as *see also*) in a dictionary catalogue are given in Ranganathan's *Dec* (*Dictionary catalogue code*) edn 2, 1952.

2 Example

Subject	Class Number
Nomography of the design of highway signals	D411, 94:4:B44

Following will be the class index entries :

1. Nomography. Design. Signal. Highway.

For materials in this subject and related subjects see the following Class Number and related class numbers. D411, 94:4:B44

In the remaining seven entries, the directing words, given in full in entry 1, are replaced by the single word "see", in orders to save space.

- | | | | | |
|--------------------|--------------|----------|---------|-------------------------|
| 2. Mathematics. | Design. | Signal. | Highway | <i>See</i> D411, 94:4:B |
| 3. Design. | Signal. | Highway. | | <i>See</i> D411, 94:4 |
| 4. Signal. | Highway. | | | <i>See</i> D411, 94 |
| 5. Highway. | Engineering. | | | <i>See</i> D411 |
| 6. Land transport. | Engineering. | | | <i>See</i> D41 |
| 7. Transport. | Engineering. | | | <i>See</i> D4 |
| 8. Engineering. | | | | <i>See</i> D |

3 Achievement

31 First

The above example, shows that, to get the subject headings the cataloguer has merely to interpret link by link the class number of the subject. The choice and rendering of the subject headings are not left to his flair. It is mechanised. It is made to depend on class number. This is the first achievement of the Chain Procedure.

32 Second

The subject headings derived from the class number are in natural language. They will provide a key to enter the classified part which is arranged by the class-numbers. These class numbers form an artificial language. These are not intelligible to readers. For example, a research worker may want to locate material on 'Nomography of the design of highway signals'. He does not know the artificial class number D411, 94:4:B44—its expression in the artificial language. He can only look through the subject headings given in natural language. He may think of his subject in his mind as "Nomography". He then looks up "Nomography". This will lead him on to the neighbouring entry "Nomography. Design. Signals. Highway." He finds a heading like that,

Here he is asked to look up the entry in the classified part headed by the class number "D411, 94:4:B44." He goes to the classified part with this class number. He reaches his exact material. Suppose his mind brings up only "Signal. Highway". The entry with this heading asks him to look up the entry in the classified part, headed by the class number D411,94. He goes to the classified part with this number. He finds himself very near his subject. As he turns to the next few cards, he lands on his material. Thus the Chain Procedure leads him to the correct spot in the classified part. The number of entries to be waded through by him in the classified part depends on the closeness of his enunciation to his actual need. It is never, however, too many. For the Chain Procedure reproduces in natural language in the alphabetical part every possible term likely to be thought of and brought up by the reader in looking for the material answering his precise need. This it manages to achieve by giving an alphabetical entry under the idea represented by every digit in the artificial language of class number occurring in the main entry in the classified part. The subject headings thus form a never-failing key to the classified part. This is the second achievement of the Chain Procedure.

33 THIRD

No synonyms are allowed in the classificatory language. The order of the facets and phases cannot therefore be varied in the class number. Hence, there can be no alternate class numbers for a subject to satisfy different approaches to the subject. Thus in our subject 'Nomography. Design. Signal. Highways', if A enters the classified part in the region where materials in 'Nomography (=B44)' are placed, *i.e.*, in mathematics of which 'Nomography' is a focus, he will fail to find his material. If he enters through the amplified subject heading, which the chain procedure has built up, so to speak, in a direction opposite to that of the links in the class number, he will get his material. Thus the catalogue compensates what the

classification cannot achieve. This is the third achievement of the Chain Procedure. This is the helpful symbiosis brought about by Chain Procedure between classification and catalogue.

4 Corrective to Classification

Sometimes the sequence in which the Chain Procedure throws the constituent terms of a Subject Heading differs from what most readers expect. This is an indication for correcting the Scheme of Classification. The sequence of either Arrays or Facets is likely to be faulty. This must be set right.

5 Symbiosis

The Colon Language prescribes that the sequence of facets in a class number should be in the decreasing order of concreteness. This is helpful to those approaching the subject from its most concrete constituent and then moving towards its less concrete subdivisions. The Chain Procedure reverses the process. It begins the Subject Heading with the least concrete constituent. This is helpful to those approaching the subject from its most abstract constituent and then moving towards less abstract subdivisions. Thus the Chain Procedure establishes a symbiosis between Classification and Catalogue. The application of the Chain Procedure is equally of use in schemes which arrange the facets in an increasing order of concreteness. Thus the Chain Procedure is not applicable only to CC.

PAPER 1·13

FORM PART OF BOOK NUMBER

K.M. Ujlambkar

[Starts with a statement of the functional differences of Class Number, Book Number and Collection Number. Traces the history of Book Number. Analyses Book Number into Zones of Language, Form of Exposition, and Year Numbers and other auxiliary zones. Points out the appropriateness of the transfer of Form Number from Class Number to Book Number. Describes and illustrates the Form Schedule of edn 4 of CC.]

0 Introduction

In *Optional facets in library classification* (6) published in the *Annals* part of *Abgila* 1, 1950, 161, Dr. Ranganathan starts his enquiry into Call Number from a traditional belief. According to it, every individual has :

- 1 Atma (=Soul) ;
- 2 Sukshma Sarira (=Subtle or intangible or astral body) ; and
- 3 Sthula Sarira (=Gross or tangible or sensually perceptible body).

Application of this idea to reading and kindred materials gives the following results :

Category	Idea Plane	Verbal Plane	Notational Plane
Soul	= Thought Content	=Subject	=Class Number
Subtle body	= Medium of expression embodying the thought	=Language and form of exposition	=Book Number
Gross body	= Physique embodying the expressed thought	=Nature, Size, Shape, etc. of the reading and kindred material viewed as a physical matter	=Sequence Number

1 Class Number

Every Scheme of Classification should provide for these three necessary elements of a book. Soul is provided for in all schemes of classification. Class Number is the provision.

11 COLLECTION NUMBER

CC has definitely segregated the part of the Call Number, concerned with physical embodiment. It is called, Collection Number.

2 Book Number

Book Number is used to individualise books having the same class number. Dr. Ranganathan describes its role, in his *Prolegomena to library classification* (Madras Library Association, publication series 6, 1937,196), as follows:— "The Book Number takes up the individualisation of a book at the point where the Class Number has to leave it as beyond its power or in other words book number is brought in when no further division on the basis of subject is possible." In the idea plane, the elements making the Book Number are shown to be

- 1 the language of the book ;
- 2 the form of exposition ; and
- 3 some other element individualising the book—say its author, or its year of publication ; and
- 4 other convenient elements if individualisation is not effected by the above. In this paper we are concerned only with the element "form of exposition". We shall ignore, for our purpose, the extra elements needed to augment the author or the year number to get individualisation.

3 History

31 DC

DC (=Decimal Classification) did not develop Book Number in integral relation with Class Number. But it had provided for the form of exposition in the Class Number itself.

32 UDC

UDC (=Universal Decimal Classification) adopted the DC tradition. It added to it by prescribing the addition of the number for the language of exposition to the Class Number.

33 CC

CC (=Colon Classification) adopted the DC tradition in edn 1-3. It provided for the form of exposition in the Class Number itself. But it rejected the practice of UDC to show the language of exposition in the Class Number. This anomaly had gone on in CC for nearly twenty years—one element of exposition going with Class Number and the other with the Book Number, neither having equally nothing to do with the subject of the book. This octopus of DC tradition in the matter was not attacked till 1950. *Optional facets* (6) was the arena of this attack. The objective analysis of that paper led to the transfer of the form of exposition to the care of book number. This was seen to be compelling, in the idea plane.

4 Facet formula of Book Number

This finding has been implemented in edn 4 (1952) of CC. The portion of the facet-formula of Book Number to which we have restricted ourselves is

[Language] [Form] [Year of Publication]
or in symbols, [L] [F] [Y]

41 FORM FACET

The form facet has been given in great detail. Here is the schedule:

CC (Book No.)	Form of Exposition	UDC (Class No.)	CC (Book No.)	Form of Exposition	UDC (Class No.)
a1	Systematical		f9533	Sound film	
			f954	Negative	
a5	Alphabetical		f955	Transpa- rent picture	
a6	Chronological		f994	Block	

CC (Book No.)	Form of Exposition	UDC (Class No.)	CC (Book No.)	Form of Exposition	UDC (Class No.)
b	Index		g	Plan	(084.2)
<i>b1</i>	Systematical		<i>g1</i>	Section	
<i>b5</i>	Alphabetical		<i>g2</i>	Elevation	
<i>b51</i>	Title		<i>g3</i>	Relief	
<i>b55</i>	Subject		<i>g6</i>	Diagram	(084.21)
<i>b57</i>	Author		h	Graph	(084.21)
			<i>h1</i>	Line	
			<i>h2</i>	Histogram	
			<i>h3</i>	Perspective	
			<i>h6</i>	Schematic	
c	List	(083.81)	j	Parody	
<i>c1</i>	Systematical		k	Adaptation	
<i>c2</i>	Numerical		m	Catechism	
<i>c3</i>	Geographical		n	Opinion	(049.3)
<i>c4</i>	Conventional		<i>p1</i>	Lecture	(042)
<i>c5</i>	Alphabetical		<i>p2</i>	Dialogue	
<i>c51</i>	Title		<i>p3</i>	Discussion	
<i>c55</i>	Subject		<i>p5</i>	Debate	
<i>c57</i>	Name		<i>p7</i>	Symposium	(082)
<i>c6</i>	Chronological		q	Code	
<i>c9</i>	Other types		v	Practical	
<i>c94</i>	Printer		<i>w1</i>	Verse	(0:8-1)
<i>c96</i>	Publisher		<i>w2</i>	Drama	(0:8-2)
			<i>w3</i>	Fiction	(0:8-3)
			<i>w4</i>	Letter	(0:8-6)
			<i>w7</i>	Champu	
d	Data book	(083.6)	x	Quotation	(082.2)
<i>d2</i>	Pattern		<i>x2</i>	Press cut- ting	(047.6)
			<i>x6</i>	Digest	

CC (Book No.)	Form of Exposition	UDC (Class No.)	CC (Book No.)	Form of Exposition	UDC (Class No.)
<i>d3</i>	Recipe				
f	Picture	(084.5)			
<i>f2</i>	Sculpture				
<i>f3</i>	Engraving				
<i>f4</i>	Graphic art	(084.11)			
<i>f5</i>	Painting				
<i>f95</i>	Photograph	(084.12)			
<i>f953</i>	Cinema film				

5 ILLUSTRATION 1

CC No.	Book	UDC No.
Y31.2.N3 <i>mF9</i>	Brayne (F.L.). Socrates in an Indian village. 1929. (<i>catechism</i>)	3-031
Y31.2.N3 <i>w4G4</i>	Gangulee (M.). Indian pea- sant and his environment. 1934. (<i>letters</i>)	3-031 (0:8-6)
Y31.2.N5 H5	Nanawati (M.B.) and Anjariya (S.J.). Indian rural pro- blem. 1945. (<i>prose</i>)	3-031

Remarks:—

0 UDC has provided only for a very few isolates in the [P] group facet. These do not include "Rural Community." Dr. Ranganathan has suggested the improvisation of the Special Analytical Division "—031" to represent it. It follows the analogy of the Special Analytical Divisions for the group isolates actually enumerated in the Abridged English edn (1947) of UDC.

1 UDC is unable to distinguish the difference in the form of exposition between the first and the third book.

2 CC distinguishes every one of the forms of exposition.

3 The fault of indicating form of exposition in Class Number instead of Book Number has already been discussed.

4 The application of chain procedure to get specific subject-heading will call for an entry under the "form of exposition" of the UDC the number used. But this will be an unsought heading. CC practice by-passes this difficulty by transferring Form Number to Book Number. Indeed Dr. Ranganathan says that it was this tyranny of the form number calling for the specific subject entry that led him to examine critically the hotch-potch nature of the common subdivisions handed down by DC tradition.

5 This critical examination led to the transfer of "form common sub-divisions" to the care of the Book Number.

6 ILLUSTRATION 2

CC No.	Book	UDC No.
zGw f95H9	Boras (J.). <i>Ed. Mahatma</i> Gandhi. 1948. (<i>Pictorial</i> <i>history</i>)	92 (Gandhi): 77
zGw 33 w1H4	Kulkarni (Keshava Rao). Lavani padas on Mahatma Gandhi. 1944. (<i>Kannada</i> <i>verse</i>)	92 (Gandhi): 3-1=9483
zGw F1	Rolland (Romain). <i>Mahatma</i> Gandhi tr by Ramaswami Aiyer. 1925. (<i>prose</i>)	92 (Gandhi)

Remarks:

1 In UDC the form numbers used in biography are different from those used in other classes.

2 In UDC, the Language Schedule takes us only up to "948 Dravidian". This has been denuded further to individualise each Dravidian Language by using the individualising digits found in CC.

3 Edn 4 of CC (1952) prescribes the representation of literature on multi-faceted, seminal, world-figures in class \mathcal{Z} amplified by Alphabetical Device. This has been followed in the above examples.

4 The CC Number of the second book shows that books will first be grouped by languages, and that the books in one Language will then be grouped by forms of exposition.

5 The new prescription of CC has two advantages:

- 1 It brings together all the literature by and on a seminal personality. This is helpful.
- 2 It brings that literature into the generalia group. This is appropriate.
- 3 It makes the Basic Class Number much shorter than it would otherwise be. It certainly makes it shorter than the UDC Number.

7 ILLUSTRATION 3

CC No.	Book	UDC No.
$\mathcal{Z}Gh$ $a1G8$	Sarma (D.S.). Gandhi sutras. 1928.	
$\mathcal{Z}Gk$ $a1H1$	Jack (Homer A.). Wit and wisdom of Gandhi	
$\mathcal{Z}Gk$ $a5J3$	Gandhi dictionary	
$\mathcal{Z}Gk$ $a6J1$	Narasimha Char. Day book of thoughts from Mahatma Gandhi	
$\mathcal{Z}Gk$ 152a1H8	Hingorani (A.). Bapu ke asirvade	
RXM72k $a5J2$	Denomn (Lester E.). Bertrand Russell's dictionary of mind, matter and morals.	

Remarks :

- 1 All the above books are encyclopaedias.
- 2 The arrangement in an encyclopaedia is usually believed to be alphabetical.
- 3 But it is also possible to arrange the entries in an encyclopaedia in other ways such as systematical and chronological.
- 4 Canon of Helpful Sequence requires that encyclopaedias on a subject should be grouped according to the arrangement of entries. The Form Number part of the Book Number in CC achieves this result.
- 5 The above variety in the arrangements of entries in an encyclopaedia is found in other subjects too. For example, the famous *Encyklopadie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen* arranges the entries in a systematic way. Many of the German *Hanbuchs* are of this kind.
- 6 The notation of UDC is not yet equipped to effect the above mentioned grouping. But it can be equipped.

PAPER 1·14

ANTERIOR COMMON SUBDIVISION**S. Parthasarathy**

[Makes a critical examination of the surviving Anterior Common Subdivisions in edn 4 of CC. Points out the formation of a Superimposed Array in the notational plane. Points out a possible unhelpfulness, which may arise. Explains this as arising out of a fallacy.]

1 Edn 4 of CC

The Acs (=Anterior Common Subdivisions) have been considerably pruned in CC, edn 4, 1952. They are as follows:

- a* Bibliography
- b* Cumulative index

- f* Atlas
- j* Festschrift
- k* Cyclopaedia
- m* Periodical
- n* Serial
- p* Conference
- v* History
- w* Biography
- x* Collection
- y7* Case study

Let us consider these in the idea and notational planes.

2 Idea Plane

None of these Acs is a form of exposition. So they cannot be taken to the Book Number Common Subdivision. None of these is a manifestation of either Personality, or Energy, or Matter. So they cannot be taken to the Posterior Common Subdivisions. They can be regarded only as aids to be studied as approach materials. So helpful sequence requires that they should be given precedence over the ordinary treatment, such as textbooks or treatises.

21 ARRAY

Let us examine the array of Acs. They seem to be arranged in a more or less helpful sequence. But still they are of a mixed nature. They can be roughly divided into five groups:

- 1 Bibliography, Cumulative index, Atlas, Cyclopaedia;
- 2 Periodical, Serial, Conference;
- 3 History, Biography ;
- 4 Festschrift ; and
- 5 Collection, Case study.

The divisions in group 1 are mainly reference materials ; those of group 2 represent periodical publications. Groups 3 and 5 are more closely related to the subject. Group 3

represents specialised approaches and group 5 is subject proper in a special assemblage. But group 4 Festschrift seems to be a misfit among the Acs. At present it is placed amidst reference materials. This is not a happy placing, as it is not a reference material. It will not also fit in with the periodical publications. Amongst the Acs, it may be placed between Biography and Collection. But Festschrift is not an approach material. Generally it consists of disjointed articles. It is similar to Symposium. But it cannot be taken to the Book Number Common Subdivisions because it has to be fitted with facets. So it has to be taken to the Posterior Common Subdivisions. It is not a manifestation of matter or energy. So it will not find a place amongst Posterior Energy or Matter Common Subdivisions. It is brought out in connection with an individual. So it can be made a Posterior Personality Common Subdivision. At present we have only Posterior Common Subdivisions like Commission, Survey, etc coming posterior to Time Facet and Profession and Institution coming posterior to Space Facet. But Festschrift cannot come after Space and Time Facets. So it has to be made a Posterior Personality Common Subdivision to be applied earlier than Space Facet.

22 HELPFUL SEQUENCE

After taking away Festschrift from Acs, let us consider the sequence of the remaining groups. Regarding groups 1 and 2, there seems to be no particular helpful sequence for them. Generally the reading materials belonging to these two groups are arranged as Reference Collection and Periodical Collection and separated from the Main Collection. Here their sequence is immaterial. Regarding bibliographical entries, their present sequence seems to be as helpful as any other. Group 3 represents specialised approach materials. Group 5 is subject proper in a special assemblage. It is closest to the general treatment like text books or treatises. So the sequence of 3 and 5 is a helpful sequence.

3 Notational Plane

At the idea plane we have seen that these Acs should have precedence over the ordinary treatment like textbooks or treatises. The implementation of this at the notational plane is made possible by the Rule 0251 of CC. "Any number followed by a small letter or an arrow shall have precedence over the original number". Thus we have:

- La Abstracts of medicine
- Lm Medical periodical
- Lv History of medicine
- L Medicine

31 SUPERIMPOSE ARRAY

Let us examine the implication of this Rule. In the notational plane, La, Lm, Lv etc are made to become co-ordinate with L and to have precedence over L, as required in the idea plane. But apparently La, Lm etc belong to the array of the next higher order: La...Lz, L1, L2, L3...L8, L91..L94, LA..LZ. However, La...Lz are made co-ordinate with L due to the anteriorising quality given to the symbols *a* to *z*. Stated in terms of an array, this quality amounts to making the digits of one array belong to an earlier array and with varying ordinal values. A similar change occurs in a (W) [P] universe, where Systems of Physics appear to belong to the same array as parts of Canonical Physics, though they belong to different Levels (see *Optional facets* (13) in the *Annals* part of *Abgila*, 2, 266).

4 A Problem

Rule 203 of CC is "Whenever warranted, two or more Common Subdivision numbers may be added in succession". This rule presents a new problem. In certain cases this violates the Canon of Consistent Sequence. Let us examine the sequence when only one Acs is present:

- Lm Medical periodical
- Lv History of Medicine
- L Medicine

This is a helpful sequence. But when m is applied after an Acs of greater ordinal value, say v , the Canon of Consistent Sequence is violated:

Lm	Periodical. <i>Medicine</i> .	Lv	<i>History, Medicine</i> .
Lvm	Periodical. <i>History,</i> <i>Medicine</i> .	L	<i>Medicine</i> .

According to helpful sequence, "History of Medicine" should come before "Medicine". But when m is applied immediately after v , we find that a periodical in "Medicine" comes before a periodical in "History of Medicine". This is a violation of the Canon of Consistent Sequence.

41 GENERALISED FORM

This problem can be generalised as follows: Whenever two Anteriorising Common Subdivisions are applied consecutively, where the ordinal value of the second is lower than that of the first, then the Canon of Consistent Sequence is violated.

5 Method of Solution

In order to find a solution for this problem we have to examine the Acs with a view to separating those that can occur immediately after an Acs.

- a can be applied directly after any Acs including a
- b can be applied only after any one of m, n , or p ; so this does not present any problem
- f, k cannot generally be applied after any Acs; they also do not present any problem
- m, n, p can be applied after any Acs
- v can be applied after any Acs other than v
- w, x cannot generally be applied after any Acs; they also do not present any problem

51 PARTIAL SOLUTION

If the Acs b, f, k, w, x , have precedence over a, m, n, p, v , then the violation of the Canon of Consistent Sequence takes

place only in the region of a, m, n, p, v . In whatever sequence the latter Acs are arranged, Consistent Sequence is violated. The instances of such violation can be kept to a minimum, if the frequency of occurrence of the various combinations can be determined.

6 A Fallacy

Probably there is some fallacy in the above argument. Let us examine the sequence required by this Canon. We have :

- L_{vm} Periodical. History. Medicine.
- L_m Periodical. Medicine.
- L_v History. Medicine.
- L Medicine.

This sequence violates a more positive principle : An approach material on a topic should cohere with the topic. This is not secured in the above example. L_{vm} and L_v are separated by L_m . This is not at all helpful. The principle of bringing together related materials is more fundamental. So this should be respected in preference to Canon of Consistent Sequence. Therefore the present sequence of Acs in C_c need not be disturbed.

PAPER 1-15

PROFESSION

K.D. Puranik

[Gives a comparative description of the treatment of the Posterior Personality Common Subdivision "Profession" in DC, UDC and CC. Arrives by induction at the isolates to be included in the [P] of "Profession". Gives samples of the [E]. Points out the need for a systematic establishment of isolates in the various facets in order to meet the demands on depth classification made by documentation work.]

1 Introduction

The Oxford English Dictionary defines a profession as "vocation in which a professed knowledge of some department

of learning or science is used in its application to the affairs of others or in the practice of an art founded upon it." The Engineer uses his knowledge of engineering to build houses, construct bridges, dams and so on. The Lawyer uses his knowledge of law in helping others settle their disputes. The Nurse uses her knowledge of nursing in helping people in managing their health. We thus have the professions of an Engineer, a Lawyer and a Nurse. We also have people practising the profession of a Statistician, a Psychiatrist or an Insurance Agent. In each of these, the persons concerned use their specialised knowledge of a subject in earning a living by managing the affairs of others. In recent years, work on the fundamental or normative or basic sciences is consciously linked on to the needs of application. This necessitates formation of profession for this section. People working in these sciences may have in their mind the uses to which work can be put. While no doubt some of their work is done for the mere joy of creation, a good deal of it has to deal with managing the affairs of others. We shall use profession in this extended sense. There would be literature on all these professions. Instead of enumerating foci in the different facets of each profession independently it is desirable to have a common subdivision to deal with literature on the professions in different subjects.

2. History

21 DC

DC (=Decimal Classification) provides a Form Division for "Profession." The following note is given under "069 Persons in relation to the subject." "Persons interested in the subject: Studying it or occupied with it as a profession or business, their character, condition, duties and activities, their life and all which concerns them. Professional ethics.....".

DC also provides a place for different professions under Labour. The following is an extract from the schedule :

331·7 Different classes of workers. Skilled and unskilled labour.

331·71 Intellectual or mental work.—Class works on a special profession under 331·76.....

331·76 In special industries, 762-7699 may be divided like 620-699 with 761 divided like the whole classification for other industries, *e.g.*, 331·763 Agricultural labour, 331·76137 Teachers.

22 UDC

UDC (=Universal Decimal Classification) provides Profession in several places.

221 Prels

The authoritative French edn of 1927-1929 provides:

004 Intellectual workers, Literary men, authors, Men of science, Learned persons, liberal professions, General conditions of intellectual workers.

For the different categories of intellectual workers, see the special subjects under the subdivision (069)

222 Common Subdivision

The same edn also provides:

069 Works devoted to the categories and classes of persons who take interest in the matter or exercise a profession or function which is attached to them. This subdivision is employed immediately only if the special sub-division does not exist. For example:

347:965 Advocates, Barristers

35·08 Administrative personnel

223 Economics

It also provides professions under 331 Labour. The following is an extract from the schedule:

331: Conditions of workers in different professions.

The class numbers of different manual professions figure in the tables under the different businesses, objects of professional occupation. They have been so called after some of the principal professions.

- :004 Intellectuals
- :62 Technicians
- :698.1 Painters of buildings
- :747 Tapistery workers. Decorators.

Professions have been also provided under 331.7. We have 331.7. Qualified and unqualified work.

- .79 Workers and work at domicile, Artisans. Fashioners.

224 Current English Edn

In the English edn, v1, Pt 1 (1943), the preliminary division 004 as well as the common subdivision (069) have been omitted.

225 Abridged English Edn

The abridged English edn (1948) also omits the preliminary division 004 and the common subdivision (069)

It also omits 331: of the French edn. But 331.7 of the French edn is spelt out in great detail as follows:

- 331.7 Types of workers. Qualified and unqualified labour
 - .75 Intellectual wokers
 - .753 Liberal professions
 - .754 Artists
 - .76 Manual workers. Craftsmen
 - .77 Employees. Officials
 - .79 Other categories

We thus see that 331.75, 331.753 and 331.754 are expected to take the place of 004 of the French edn.

226 Facets C

The French edn does not attempt any facet division for Professions. But the abridged English edn gives 20 isolates under the caption "331.0 Special Auxiliary Numbers." These are too general.

23 CC

231 Edns 1-3

In edn 1, CC provides *b* as an anteriorising common subdivision isolate to denote Profession. It was fitted with an energy facet of 24 isolates. Rule 2*b* provided for the addition of Space and Time facets. It met with some awkward situation in the provision of connecting symbol. There was no change in edns 2 and 3.

232 Edn 4

Edn 4 has implemented some of the findings recorded in *Optional facets* published in *Annals* of the Indian Library Association forming part of *Abgila*. One result is this:

Profession is regarded as a Posteriorising Personality Common Sub-division to be applied after Space-facet. Its isolate number is still *b*. As it is now deemed to be posterior personality facet, it must be preceded by "," (comma). But edn 4 has omitted the schedule of energy-isolates given in earlier edns. It was felt that this required a thorough overhauling in the light of recent findings.

The object of this paper is to fit the common subdivision *b* with facets.

3 Personality Facet

IN GREAT BRITAIN. GENERAL REGISTER OFFICE. *Classification of occupations*, 1950, different occupations are listed. The following groups are suggested for three of the occupations, by an analysis of them.

31 NURSING

Group 1

Male Nurse

Group 3

Village Nurse

District Nurse

Group 4

Maternity Nurse

Surgery Nurse

Clinic Nurse

Infirmary Nurse

Mental Nurse

Infant Welfare Centre Nurse

Group 52

Nurse

Health Visitor

Home Sister

Group 53

Independent Midwife

Ambulance Nurse

Tuberculosis Visitor

Industrial Nurse

Children's Nurse

Group 5

Nursing Home Manageress

Hospital Superintendent

Country Superintendent

Departmental Sister

Charge Nurse

Matron

Supervisor of Midwives

Superintendent

Private Nurse

Group 54

Student Nurse

Trainee Nurse

Probationer Nurse

The above-mentioned book also gives some other names under the occupation "Nursing". These, however, are virtually alternative forms of other names.

32 SURVEY

Group 41

Road Surveyor

Estate Surveyor

Building Surveyor

Wood Surveyor

Group 42

Quantity Surveyor

Cost Surveyor

Insurance Surveyor

Group 51

District Surveyor

Land Commissioner

Group 52

Surveyor's Premium

Apprentice

Surveyor's Premium Pupil

33 INSURANCE

Group 4

Insurance Consultant

Insurance Claims

Representative

Insurance Claims

Investigator

Enroller

Inspector of Risks

Claims Inspector

Average Adjustor

Accessor

Group 51

Manager

Branch Manager

Branch Secretary

District Manager

Group 52

Supervisor

Superintendent of Agents

District Superintendent

Section Superintendent

Superintendent

Insurance Inspector

Group 53

Commission Agent

Assurance Agent

Assurance Company's

Collector

Canvassing Assistant

Insurance Agent

34 CONCLUSION

From the above, we see the need for [P] (= a first level, first round, Personality Facet) after *b*. There is no need for a connecting symbol between *b* and [P]. Isolates in the first order array of [P] may follow the same mode of grouping as that given for [Y] in edn 4 of CC, with suitable modifications needed for a particular profession.

341 Modification

The following modifications are suggested:

4 Specialising groups within a profession

Illustrative for Insurance

Inspector of Risks

Claims Inspector

Average Adjustor

Insurance Consultant

5 Group by Status

Illustrative for Nursing

Supervisory

Working

Training

8 PROFESSIONAL UNION**342 Second and Higher Orders**

Isolates in some of the second order arrays of [P] will vary from profession to profession. But they can be mnemonically fixed. In this connection the *Classification of occupations* mentioned above will be of much help. It contains about 10,000 occupations grouped under 981 heads.

343 Simplification in CC

According to the prescription of CC, 10,000 occupations do not raise any special problem in classification. For, *b* will be applied only after the class number has been worked out to individualise the occupation of profession.

4 Material Facet

Distinctive dress and other equipment of a profession will occur in the [M] (=Material Facet) following the [P].

5 [E]

The following is a sample schedule of isolates in [E].

- | | |
|-----------------|------------------------|
| 1 Qualification | 5 Working Conditions |
| 2 Recruitment | 6 Standards |
| 3 Training | 94 Professional Ethics |
| 4 Research | 95 Relation |

6 [2P]

There may be need for [2P]. This will come after [E]. The isolates of [2P] will be different for different isolates in [E]. The following are some illustrations.

61 FOR [E] 1 QUALIFICATION

- | | |
|-------------|---------------|
| 1 Physique | 4 Conduct |
| 2 Mind | 5 Status |
| 3 Education | 7 Personality |

611 Remarks

1 Edns 1-3 of CC enumerated these isolates of [2P] as isolates in the second order array of [E]. The fact that these were isolates of [2P] and not of [E] was concealed by their being given (in the verbal plane) as adjectives of "Qualification." The adjectival form created an impression that they were manifestations of Energy. If, however, we remove the adjectival form, the Physique, Mind, Education etc. show themselves to be manifestations of Personality and not of Energy. The appropriateness of regarding them as isolates of [2P] can be seen.

2 It has been stated that Energy alone can start a round of manifestations of Personality and Matter. Thus we have [P] before and after [E]. We distinguish them in this manner. The one before is acted upon by [E]. The one after is the help with which action takes place. We may say that the [P] after [E] is *Karana* or *Sahaya* (= Means or help). Let us take the isolate "Qualification" in [E]. It qualifies—acts upon—the person. The Physique, Personality, etc., on the other hand, are the media through which the qualification—takes place. If this line of interpretation is accepted, Physique, Personality etc. should come after [E] 1 Qualification. They form isolates in [2P].

62 [2P] FOR [E] 2 RECRUITMENT

Similarly, "2 Recruitment" will have the following isolates in [2P].

- 1 Agency
- 2 Government
- 3 Semi-Government
- 4 Private
- 5 Corporate
- 6 Individual

621 Remarks

1 That the "Agency"—"Government, Private, etc."—belongs to [P] is more obvious than in the case of Physique, Education, etc. in 61 above.

2 That the "Agency" is a help in recruitment and may therefore form [2P] is also quite clear.

63 [2P] FOR [E] 95 RELATION

The following are the isolates of [2P] for 95 Relation

- 1 Other Profession
- 2 Other branches of the Profession
- 3 Subject

64 UNSOLVED PROBLEMS IN [2P]

We have yet to examine other isolates in (E), viz. 3 Training, 4 Research, 5 Working Condition, 6 Standards 94 Professional Ethics, to find out whether they require [2P] and if so, the isolates of [2P]. This needs further investigation.

7 [2E]

Different isolates in [2P] may require different [2E]. For example, 2 Recruitment may have the following isolates in [2E].

- 1 Method
- 2 Examination
- 3 Interview

8 Examples

CC No.	Subject	UDC NO.
1 L7:4.0,d,6511	Superintendent of a mental hospital	616.83:061.27.007.1
2 L7:4.0,d,6512	Departmental sister of a mental hospital	616.83:061.27.007.1

CC No.	Subject	UDC NO.
3 L7:4·0,d,b41	Children's nurse in a mental hospital	616·83:061·27·007·2:616·053·2
4 L7:4·0,d,b43	Maternity nurse in a mental hospital	616·83:061·27·007·2:618·2
5 L7:4·0,d,b47	Surgery nurse in a mental hospital	616·83:061·27·007·2:617
6 L7:4·0,d,b47:1	Qualifications of the surgery nurse in mental hospital	616·83:061·27·007·2:617
7 L7:4·0,d,b47:1,3	Educational qualifications of a surgery nurse in a mental hospital	616·83:061·27·007·2:617
8 L7:4·0,d,b47:2	Recruitment of surgery nurses in a mental hospital	616·83:061·27·007·2:617:331·11
9 L7:4·0,d,b47:2,2	Government recruitment of surgery nurse in mental hospital	616·83:061·27·007·2:617:331·11
10 L7:4·0,d,b47:2,2:2	Government examination for recruitment of surgery nurse in mental hospital	616·83:061·27·007·2:617:331·11

81 REMARKS

811 Length of Class No.

In the above table the average number of digits in CC is 14. In UDC, it is 25.

812 Reason for lengths

The greater length of UDC No. is due to its using phase-device in places CC uses facet-device. The posterior common subdivisions, fitted with facets of their own, add to the brevity of CC No.

813 Arrangement

The CC and UDC arrange the subjects in virtually the same order. Generally, this happens in depth classification. Difference arises only in the macro region controlled by the DC core of UDC. This justifies the inference that CC and UDC

1 make more or less the same approach in their analysis of a composite subject into its constituent elements; and

2 assemble the resulting isolate numbers in accordance with the same "Principle of Decreasing Concreteness".

9 Unsolved Problems

A complete schedule has not yet been worked out for any profession. Nor is it necessary to give it in the published schedules of classification. By working out schedules for a few typical professions and making a comparative study of them, it may be possible to enunciate certain general principles and get some unscheduled mnemonics. This is necessary to ensure autonomy for the classifier. This is one of the investigations to be taken up in future.

PAPER 1-16

FACET FORMULA FOR INSTITUTION

S. Parthasarathy

[Demonstrates the use of the concepts of Optional Facet, Round and Level in fitting an After-Space Posterior Personality Common Subdivision, such as an Institution. Gives model schedules. With a comparative table of CC and UDC numbers for ten subjects, indicates the similarity of the sequence got by both, and the relative economy of CC number].

1 Introduction

In edn 4 of CC, "Institution" is accommodated among Ppcs (= Posterior Personality Common Subdivisions). They are as follows:

<i>d</i> Institution	<i>j8</i> Repairing
<i>e</i> Educational	<i>k</i> Publicity
<i>f</i> Pooling	<i>m</i> Distribution
<i>g</i> Investigating	<i>n</i> Servicing
<i>g2</i> Observational	<i>p</i> Consumer
<i>g3</i> Experimental	<i>q</i> Managerial
<i>g4</i> Discussional	<i>r</i> Exploratory
<i>g7</i> Yogic	<i>s</i> Advisory
<i>h</i> Business	<i>t</i> Deliberative
<i>j</i> Producing	<i>v</i> Executive
<i>j3</i> Assembling	<i>w</i> Administrative
<i>j4</i> Testing	<i>x</i> Sanctioning
<i>j7</i> Finishing	<i>y</i> Revising

They can be grouped on the basis of their set-up and character into the following main types: General (*d*), Society (*d*), Educational (*e*), Research, (*g*), Manufacturing (*j*) Commerce (*k* to *q*) and Administrative (*r*-*y*). The facet-formula for an "Institution" will depend upon its nature and set-up. This paper attempts to fit a facet-formula for the type "Society".

2 After Space Facet

"Institution" is generally regional in character. A general account of the local conditions of a subject in a geographical area will treat also about the activities of the Institutions concerning the subject in that area. In other words, the activities of the Institutions in an area determine to some extent the development of the subject in that area. A general treatment should have precedence over an account of individuals. This is to conform to the Principle of Decreasing Extension. To secure this sequence, and "Institution" should be accommodated after Space Facet in any subject. Here are examples.

CC No.	Subject	UDC No.
L:5.2.N5	Public health in India in 1950's	614(54) "195"
L:5.2.d	Public health institutions in India	614(54):06

Incidentally, this demonstrates the value of making ". " less in ordinal value than ", ".

3 Individualisation

An Institution can be individualised by

- (1) Alphabetical Device,
- (2) Chronological Device, or
- (3) Geographical Device.

This is discussed in section 5621 of *Optional facets* (8) by Dr. Ranganathan (see *Annals* part of *Abgila*, 2, 151). The digits added for individualisation form the [P] after the Ppcs.

Subject Device will be redundant because the subject has been already represented before Space Facet. Alphabetical Device and Chronological Device are equally convenient. Alphabetical Device is preferable because it is easily ascertainable. Change of name will however violate the Canon of Permanence. The difficulty caused by this may be minimised by the catalogue. Since Space Facet precedes Ppcs, individualisation of an Institution can also be obtained by sharpening the isolate number in Space Facet to represent the locality of the Institution. For example

CC No.	Subject	UDC No.
C.2,g3	National Physical Laboratory of India	53(54):061-6
C.224,g3	Raman Institute, Bangalore	
C.231,g3	Tata Institute of Fundamental Research, Bombay	
C.23181,g3	Physical Research Laboratory, Ahmedabad	

Though it is possible to secure individualisation by this method, the result may not be helpful beyond a point. This "critical point" has to be determined. This may vary also with the status and nature of an Institution. This is a problem to be pursued.

4 Facet Formula

41 [P]

The isolates in [P] should be got by Alphabetical or Chronological Device.

The number of digits in [P] isolate number used to individualise an Institution is not fixed. Therefore the isolate number of [P2] should be preceded by its connecting symbol " , ",

42 [P2] ORGAN

The isolates in "[P2] Organ" may consist of the following isolates. Isolates 1 to 3 are "unitary isolates." The others are "group isolates".

CC Isolate No.	Isolate Term	UDC No.
1	General body	06·042
2	Council	06·043
3	Executive	06·044
4	Committee	06·045
94	Seminar section	06·024·3
96	Research section	06·024·3

The isolates in this facet will depend upon the constitution of a Society. Those enumerated above are only illustrative.

43 [P3]

431 [P3] for [P2] 1 General Body

The isolates in [P3] for "1 General Body" may consist of "group isolates" corresponding to the diverse groups of constituents or members.

CC Isolate No.	Isolate Term	UDC No.
1	Personal	06·023·22
2	Ordinary	06·023·44
3	Life	06·023·46
6	Patron	
7	Honorary	06·023·7
91	Corporate	06·023·24
97	Association	
98	Institution	

432 [P3] for [P2] 3 Executive

The isolates in [P3] for "3 Executive" may consist of the following isolates. Isolates 1, 6 and 7 are usually "unitary isolates". The others may be "unitary isolates" or "group isolates". This will depend on the constitution of the Institution.

CC Isolate No.	Isolate Term	UDC No.
1	President	06·044·2
2	Vice-President	06·044·3
5	Public Relation Officer	06·044·6
6	Treasurer	06·044·5
7	Librarian	06·044·6
8	Secretary	06·044·4

The remarks made in Section 42 are applicable to [P3] also.

5 Energy Facet

The following isolates in [E] suggest themselves:

CC Isolate No.	Isolate Term	UDC No.
<i>j</i>	Foundation	06.012.2
<i>k</i>	Constitution	06.013
<i>m</i>	Function	06.05
<i>p</i>	Meeting	06.053
<i>q</i>	Election	06.022
<i>v</i>	Relation with State	
<i>w</i>	Administration	06.041
<i>x</i>	Finance	06.047
<i>y</i>	Public Relation	06.048.2

These isolates can occur in all Institutions. These are, therefore, best accommodated as Posterior Energy Common Subdivisions. The CC No. in the above table implements this idea. The isolates and their numbers are tentative, they are to be tested by application to other subjects.

51 SPECIAL ENERGY ISOLATES

Only distinctive energy isolates of a particular Institution should be accommodated in the first octaves. Except for inviting attention to the appropriate one among the principles laid down in the *Elements of library classification* (Kaikhushru Taraporevala memorial series in library science, 4), 1945, by Dr. S.R. Ranganathan to satisfy the Canon of Helpful Sequence, and the satisfaction of the Canon of Mnemonics (scheduled as well as unscheduled), it is not possible to enumerate the isolates. These will have to be determined by the context of each Institution.

6 Second Round

61 [2P] for [E] *m* FUNCTION

Some of the isolates of [2P] for [E] "*m* Function" may be as follows. All these are "group isolates".

CC Isolate No.	Isolate Term	UDC No.
4	Forum	06·053
5	Publication	06·055
53	Book	06·055·6
54	Periodical	06·055·2
55	Publicity Material	
58	Administrative Report	06·055·5
91	Education	
92	Pooling	
93	Research	

62 [2P] FOR [E] ρ MEETING

The second round first level personality facet for " ρ Meeting" will be the Time Facet individualising the Meeting.

63 [2P2] for [E] ρ MEETING

Some of the isolates of [2P] for [E] " ρ Meeting" may be as follows. These are all "group isolates".

CC Isolate No.	Isolate Term	UDC No.
1	Notice	06·053·2
2	Papers	06·053·4
3	Agenda	06·053·3
7	Resolution	06·053·6
8	Minutes	06·053·7

64 [2P] for [E] x FINANCE

Some of the isolates of [2P] for [E] " x Finance" may be as follows. These are all "group isolates".

CC Isolate No.	Isolate Term	UDC No.
1	Budget	
2	Subscription	06·026·433
21	Poll	
24	By Income	

CC Isolate No.	Isolate Term	UDC No.
4	Commercial Undertaking	
5	Grant	
51	Central Government	
52	State "	
56	Local Authority	
6	Expenditure	

These isolates follow the scheduled mnemonics set in "X Economics". For example "2 Subscription" is similar to "2 Tax" which is a legal right to collect money. "21 Poll subscription" is similar to "21 Poll tax". The subscription of an ordinary member of the Indian Library Association is a "Poll subscription". There may be other basis for variation in Subscription. One method is to vary the Subscription on the basis of Income. For example, the subscriptions of an Association Member to IFLA is based on its income.

65 [2E] for [2P] 5 PUBLICATION

Some of the isolates of [2E] for [2P] "5 Publication" may be as follows:

CC Isolate No.	Isolate Term	UDC No.
5	Indexing	
7	Editing	
8	Storing	

66 [2E] for [2P] of [E] ϕ MEETING

The following isolates in [2E] for all isolates in [2P] of [E] " ϕ Meeting" are given as illustrations:

CC Isolate No.	Isolate Term	UDC No.
1	Drafting	
2	Duplicating	
3	Communicating	

The isolates given above for Second Round Facets are only illustrative. These will have to be determined in the context of the constitution of each Institution.

7 Examples

CC No.	Subject	UDC No.
2·0, <i>d</i>	Library associations in general	02:061·22
2·1, <i>d</i>	International Federation of Library Associations	02:061·22(100)
2·1-1, <i>d</i>	Library associations of the world	02:061·22(100·3)
2·2, <i>dN</i>	ILA (= Indian Library Association)	02:061·22(54)
2·2, <i>dN</i> : <i>x</i> ,1	Objects of ILA	02:061·22(54): 06·01
2·2, <i>dN</i> : <i>m</i> ,58	Publication of ILA administration report	02:061·22(54): 06·055·1
2·2, <i>dN</i> : <i>x</i> 1	Budget of ILA	02:061·22(54): 06·047·42
2·2, <i>dN</i> : <i>y</i>	Public relation of ILA	02:061·22(54): 06·048·6
2·2, <i>dN</i> ,1: <i>p</i>	Meeting of the General Body of ILA	02:061·22(54): 06·053
2·2, <i>dN</i> ,1: <i>p</i> ,2	Papers for the meeting of the General Body of ILA	02:061·22(54): 06·053·4
2·2, <i>dN</i> ,1: <i>p</i> ,2:1	Circulation of papers for the meeting of the General Body of ILA	02:061·22(54): 06·053·4
2·2, <i>dN</i> ,1: <i>p</i> ,8	Minutes of the meeting of the General Body of ILA	02:061·22(54): 06·053·7
2·2, <i>dN</i> ,1,7: <i>q</i>	Election of honorary member to ILA	02:061·22(54): 06·023·7:06·022
2·2, <i>dN</i> ,94	Library seminar of ILA	02:061·22(54): 06·06
2·2, <i>dN</i> ,96	Research circle of ILA	02:061·22(54): 06·06

71 REMARKS

In the case of the Posterior Common Energy Isolate "p Meeting", [2P] must individualise the Meeting. Thus we have

2.2,dN,1:pN53,2 Papers for the 1953 meeting of the General Body of ILA. The UDC No. will be 02:061·22(54):06·053 "1953". 4

72 COMPARISON

1 The CC Nos. are more compact and elegant than the UDC Nos.

2 The average number of digits of CC Nos. for the fifteen examples is 9·53, whereas for UDC Nos. it is 19·4. The reasons for the length of UDC Nos. being twice that of CC Nos. are as follows:

- 1 UDC uses 6 digits for representing Institution, whereas CC uses only 1 digit.
- 2 UDC uses 2 digits for representing Library Science, whereas CC uses only 1 digit.
- 3 UDC uses 4 digits for representing India, whereas CC uses only 2 digits
- 4 UDC has to repeat the whole block of :06 to represent any subdivision of a particular Institution. For example, in the Class Number 02:061·22(54):06·047·42 Budget of ILA, the block of digits :06 is repeated twice.

3 The CC and UDC Nos. run almost in a parallel sequence. It is conjectured that the Class Numbers in different analytico-synthetic schemes of classification will run almost in parallel sequences, particularly at depth-level. But for its outmoded DC core, UDC sequence will maintain this parallalism even at macro level.

73 GENERALISATION

The Library Research Circle has been digging into the foundations of depth-classification. Some new principles have been isolated. The results are being published in *Abgila*. The general principles formulated and the techniques developed so far are demonstrated in the papers of this symposium. The results obtained till now are encouraging. The facet-formula worked out above for "Society" is only an illustration. I appeal that other librarians should also work out similar schedules for the other types of Institutions and communicate their results through *Abgila*. This will give readily applicable class numbers to libraries doing documentations work. This will also stimulate the sharpening of the technique.

8 Problems to be Solved

- 1 Fitting Facet Formula to different types of Institutions.
- 2 Determining the extent upto which the geographical number in the Space Facet, preceding Ppcs, has to be worked out. Is the geographical area to be a Country, State, District or Locality?

PAPER 1.17

GEOGRAPHICAL ISOLATES**R.S. Goyal**

[Shows that the two-dimensional space of the surface of the earth can give rise only to a succession of arrays in the same facet. Examines a helpful specialisation in the use of the different zones and octaves of each array. Points out the formation of superimposed array, in the notational plane].

1 Introduction

The earlier papers of this symposium show that new ideas are developing fast in Depth Classification. These developments call for a re-examination and re-construction of the Geographical Isolates. These will normally belong to Space Facet.

In some cases—*e.g.*, History—these may belong to Personality Facet. But this may not make much difference in their enumeration. Space can be of many dimensions. Geographical Space is, however, taken to be only two dimensional. Indeed it is the area covered by the surface of earth ignoring all its physiographical features and rise above or fall below the surface.

2 Examples

Here is an assortment of Geographical Isolates. This shows various possible divisions of Geographical Space.

- | | |
|-------------------------------------|---|
| 1 World | 13 South-East Asia |
| 2 Several countries | 14 Underdeveloped countries of Asia. |
| 3 Roman Empire | 15 India |
| 4 Pacific countries | 16 South India |
| 5 Tropical zone | 17 Hindi-speaking India |
| 6 Deserts of the world | 18 India before partition |
| 7 Fresh water regions of the world. | 19 Uttar Pradesh |
| 8 The East | 20 Southern Agricultural Circle of Uttar Pradesh. |
| 9 English-speaking countries. | 21 Delhi City |
| 10 Member-States of U.N.O. | 22 Sahara Desert |
| 11 Asia | 23 Chandni Chowk (Delhi) |
| 12 Pan-Asia | |

3 History

DC (=Decimal Classification) was designed primarily to meet the needs of macro thought. It, therefore, contented itself by enumerating isolates corresponding only to a few of the above divisions, such as Political, Administrative and Physiographic. To represent macro thought embodied in books, a minute area such as a city or a street is seldom necessary.

A large area, such as Great Britain, England, Ireland, India, Uttar Pradesh and Bengal alone will have to be individualised in most cases. But to represent micro thought embodied in articles in periodicals, there is need to represent all kinds of minute areas of the earth. UDC (= Universal Decimal Classification) took the lead in the matter. It provided isolates for areas of all sorts. But it failed to achieve strict parsimony in notation. CC came out with some modifications of the traditional schedule of Geographical Isolates to secure more parsimony and desirable helpful order. It also did not exhaust all types of areas. It is only two years ago that Dr. Ranganathan, the originator of CC, started discussion of Space Facet in his Series on "*Optional facet library classification*". Things have not yet reached the final stage. They are being moulded and remoulded in the light of new experiences at the Library Research Circle of the Indian Library Association.

4 Array, the Only Means

41 PORTION

As already stated, earth's surface, is a two-dimensional universe. Unlike Time, it is finite. Extent is the only characteristic available to de-whole it. Its parts derived on the basis of this characteristic possess all the attributes of the original universe. They differ only in measure. In accordance with the prescription of Ranganathan's *Optional facets* (15), published in *Abgila*, 3, No. 1, 1953 March, they cannot, therefore, be Constituents. Nor can they be Organs. They are only Portions. To illustrate, let us take the area corresponding to India. Let us ignore all the physiographical features. It is merely a two-dimensional space. This part contains all the attributes of the whole universe of space. It differs from the whole of the earth's surface in one respect only. Its extent is smaller. Thus, the area occupied by what is known as India is a Portion of the earth's surface.

42 CONFIGURATION

Geographical area considered by us is empty. It contains nothing. It is known by the name of what occupies it. The portion occupied by India is called India. Similarly the Portion occupied by Asia is called Asia. Portions such as Europe, Asia, America, Africa, or Uttar Pradesh, Bengal, Rajasthan have no quantitative similarity. We cannot use a quantitative unit to form portions of successive lower orders. All the above groups whether continents, or countries, or states or districts etc. are based merely on configuration. This is not quantitative. It may be political, administrative or the like. Configurations such as English-speaking countries, Muslim States or Pacific Countries are derived on the basis of language, religion or water-formation respectively.

43 WORLD AS A WHOLE

In Space, a finite universe, we can have the whole as well as portions. The first category in section 2 is the whole. The others are portions. In other words, we must have an Isolate Number for World. CC gives it. DC did not. UDC has made amends.

44 ARRAY

In his recent *Optional facets* (15), Dr. Ranganathan has clearly shown that Portion can not lead to change of Level i.e., Facet. It can only lead to change of Array. Change over to configurations of smaller extent contained in a bigger one, can only lead to the formation of a new Array. *Optional facets* (9) appearing in *Abgila* 2, 1952, 173-200, Dr. Ranganathan had proposed to denote Orientation by [S2] Second Level Space. Since breaking down of the part in the portion, constituent and organ was not then developed, the error crept in. Now we have clearly defined what the various types of parts mean. We should therefore remove the above error. We should confine ourselves only to denudation. We should think of such devices

as may help accomodation of all sorts of portions within the arrays of one facet, without change of facet.

5 Use of Octaves

51 FIRST ORDER ARRAY

511 First Octaves

In CC, the First Order Array in the Geographical schedule is a superimposed one. The first Isolate is World. The rest are, generally speaking, continents. These belong to the Second Order Array. The second and the third Isolates are countries. These belong to the Third Order Array in the Idea Plane. But, they are all superimposed on the First Order Array

52 SECOND ORDER ARRAY OF WORLD

In CC, the Second Order Array of '1 World' is used for several purposes.

521 First Octave

The first half of the octave is used to represent countries bordering on an ocean or sea.

Examples

CC No.	Area	UDC No.
13	Pacific countries	
14	Arctic countries	
15	Atlantic countries	

The rest of the octave is reserved for zones and other configurations.

522 Second Octave

The second octave is reserved for physiographic groupings

523 Last Octaves

The Last Octave is reserved for division by Subject Device. But, recent investigations in the Library Research Circle of the Indian Library Association has suggested the following use for them :—

5231 *Last Octave*

Last Octave. World States and near-World States. Chronological Device.

Examples

CC No.	Category	UDC No.
1N	League of Nations	
1N4	United Nations	
1N47	The Commonwealth	

5232 *Penultimate Octave*

Penultimate Octave. Orientation Divisions. Enumeration.

Examples

CC No.	Category	UDC No.
19A	East	
19B	South East	
19C	South	

5233 *Third Last Octave*

Third Last Octave. Subject Configurations. Subject Device.

Examples

CC No.	Isolates	UDC No.
199F	Industrialised countries	100·1-316·7 ~
199H7160	Uranium producing countries	100·1-315·467·9
199P123	Spanish speaking countries	100·1-6
199Q7	Islamic countries	100·1-022·97
199W4	Monarchies	100·1-023·216
199W6	Democratic countries	100·1-023·214
199W77	Colonies	100·1-52
199W78	Mandated countries	100·1-023·210·27
199Y3	Developed countries	100·1
199Y42	Undeveloped countries	100·1
199Y438	War devastated countries	100·1-023·413

53 CONTINENT

The first octaves in the First Order Array have been used for political divisions. The Last Octaves may be used in the same way as for 1 World.

54 COUNTRY

The First Octave in the First Order Array has been used for political administrative division. The Last Octave will be used to denote the counting in the configuration it had in the epoch represented by the chronological number forming the digit in the Last Octave. This corresponds to the idea of "Specials" defined in *Optional facets* (13) in the *Annals* part of the *Abgila*. From this point of view, the contemporary configuration will be taken as the favoured configuration. The Chronological Digit will be dropped, with the result, the divisions based on the contemporary configuration have precedence over earlier ones. There is an element of impermanence in this. But this cannot be helped. The impermanence is a fact inherent in the external world. It is a matter

of Geo-politics. Classification has no alternative except a step with it. As other major changes occur, the schedule of Geographical divisions will have to be redone.

The other Last Octaves can be used as in the case of World.

PAPER 1.18

PRELS

S.R. Ranganathan

[Describes the genesis of the concept "Prels". Examines the emergence of main classes in the past. Calls the traditional main classes the "Positive Main Classes". These occupy the last octave. These deal each with a part of the universe of Knowledge. Prels are universally pervasive. They deal only with the subtle-body-embodiment and the bodies embodying them or serving their physical-body-embodiments. These occupy the First Octaves. Indicates the possible use of the Penultimate Octave for classes like general semantics dealing with the formation of the soul of any main class. Shows the use of the Pre-first octave for "Generalia" materials. Makes a critical study of "00 Prolegomena" of UDC].

1 Pressure of Tradition

Edn. 1 to 3 (1933 to 1950) CC had succumbed to the pressure of DC tradition in the schedule to the so called "Generalia". The unthinking way in which it had so succumbed will be obvious from the following table.

CC No.		Isolate Subject	DC No.	
Generalia Class	Common Isolate		Common Isolate	Generalia Class
1	<i>a</i>	Bibliography		01
2		Library Science		02
3	<i>k</i>	Encyclopaedia	03	03
4	<i>l</i>	Society	06	06
5	<i>m</i>	Periodical	05	05
8	<i>n</i>	Year Book	05	058
61	<i>p</i>	Conference	063	06·13
62	<i>t</i>	Commission	061	061·24
63	<i>d</i>	Exhibition	064	061·4

By a facile notational adjustment DC seeks to represent a generalia class and the analogous common isolate by more or less similar digits. CC does not have that justification to use Arabic numerals to represent generalia form divisions abandoning the use of the lower case letters prescribed by itself for the corresponding form divisions occurring as common isolates. It is obvious that this has been done under the pressure of blind tradition without thinking.

11 ESCAPE FROM TRADITION

In edn 4 (1952), CC has recovered from this obsession. It has set aside this tradition. It uses for the generalia form division the same lower case digit which it uses for the corresponding common isolate. A class number beginning with a lower case letter is a generalia common sub-division. Of course as shown in paper 1·14 of Shri S. Parthasarathy, these anterior common sub-divisions have been rationalised even further. Many of them have been transferred to posterior common sub-divisions. Some others have been transferred to Book Numbers. The resulting schedule of anterior common sub-divisions has been considerably slimmed. This paper is not, however, concerned with that.

12 VACANCY CREATED

The above rationalisation of the application of anterior common sub-divisions to Generalia had resulted in releasing digits 1 to 8 from use, in edn 4. Use had to be found for these digits.

13 USE OF VACATED NUMBERS

Edn 4 of CC has used the vacated numbers in the following manner. The terms in natural language are improvised ones. They will be replaced as soon as more elegant words become current. But the meaning of these improvised terms is obvious. We shall therefore consider the following table without going into the linguistics of the terms in the natural language :

CC No.	Main Class Prel	UDC No.
1	Universe of Knowledge	001
2	Library Science	02
3	Book Science	
4	Periodical Publicationism	
41	Serialism	
42	Periodicalism	
45	Journalism	07
5	Encyclopediology	03.01
6	Bibliographiology	01
7	Biographology	92.01
8	Institutionology	
81	Learned Body	
83	Laboratory	
85	Display body	
855	Exhibitionology	061.4.01
86	Museology	069.01
93	Communicationism	
96	Report-writing	
97	Editing	
972	Indexing	001.815
98	Standardisation	

2 Mimamsa Principle

The use of the vacated digits 1—8 in the manner indicated in the above table follows the Mimamsa principle of "Burnt chariot, lost horse". According to this principle, if we have no use for certain numbers and there are certain subjects without numbers, we must explore the possibility of using those numbers for these subjects. Such a use should of course be adopted only if consistent with helpful sequence.

3 New Main Classes

We shall now explain the appearance of the new classes mentioned in the table of 13. To reach this explanation we should first examine the formation of main classes in a scheme of classification. Historically Vedic classification began with four main classes. Aristotle began with three. Bacon adopted these three. In the nineteenth century, proliferations of the three main classes had become well established. Many of them had developed an individuality of their own—their own roots, stems and modes of throwing forth branches. The classification of the literature in any such well established proliferation demanded treatment, independent of the original main class from which it came. The literature in the original main class as a whole began to decrease in quantity. By the time of the design of DC, it was found comfortable to start with 9 main classes and a generalia class. This was the indication of collections in a general or a public library. Such a library had more materials on Humanities and Social Sciences than in Natural Sciences or their applications. Therefore, 7 out of the 9 main classes, went to the former. However, within the next half a century academic libraries came to be classified in larger numbers. These had an abundance of materials on pure and applied sciences. The pursuit of these subjects was accelerated with the advance of industrialisation. Each of these developed its own "roots, stem and mode of throwing forth branches." The literature produced on their original main class *qua* class began to become vanishingly small. Thus the conditions for treating them as main classes were rapidly established. Therefore CC started with the sub-divisions of DC '5 Pure Sciences' and '6 Applied Sciences' as main classes. This was done as early as November 1924.

31 OLD MAIN CLASSES

To accommodate the old material as well as any occasional new materials, likely to embrace several pure sciences, these

were given a generalia class of its own *viz.* "A". Similarly the generalia for applied sciences was sought to be represented by capital "M". Of course "M" had also to be the refuge for all the myriads of useful arts and crafts which are also applications of pure sciences.

32 NEW SPECIES NOTATION

In the notational plane, this became possible by abandoning the base of Arabic numerals to represent main classes, and adopting the base of Roman capital letters in its place. The Expansive, the Library of Congress and the Subject Classifications had no doubt already adopted the capital letter base for the main classes. But they had not started with all the main classes of CC. Therefore they often gave more than one letter to one main class.

33 A NEW VENTURE

In edn 2 (1939), CC made a further departure. This was necessitated by a development in the world of books. Mystic, trans-intellectual knowledge, unmediated by primary senses and intellect, had been during the last five centuries suspects in Western countries. Since the age of the burning of the witches, it was against convention even to speak about such knowledge or experience. The old literature of the West embodying such experience went out of vogue. In its imperialistic expansion into the East, the West found masses of such literature. They were promptly branded down as primitive, mythological and superstitious. They were regarded as of ethnological or anthropological significance rather than as having any positive worthwhile contents of their own. As an effect of this anaesthetisation, of "intuition" (=the trans-sensual, trans-intellectual process of knowing) it became feeble in course of time. By the end of World War I, something had happened in the West in this matter. A few writers began to defy social convention. They began to expound, at least

obliquely, the results of mystic experience. A poet like William Blake, who was not understood by his contemporaries, gained in appreciation. New editions and new interpretations of such authors began to appear. Medieval works, such as those of Saint Francis of Assisi and St. John of the Cross were brought out in handsome editions. New schools like those of Theosophy and Anthroposophy began to interpret phenomena from the angle of mysticism. Rudolf Steiner and his co-workers in Anthroposophy made a valiant attempt to have intellectual, laboratory verifications of some folk-practices in applied subjects like Agriculture and Medicine, based on trans-sensual, trans-intellectual, mystic experience. While in Switzerland, I found that the common man looked upon his countrymen Rudolf Steiner and his associates as cranks. This shows that mystical, trans-intellectual awareness has not yet become wide-spread in the West. But the flow of old mystical literature brought to print is a sufficient indication that the revival has begun. This factor made me re-examine the still-current literature of the East, which had been branded by the West as "primitive, mythological and superstitious." I had the opportunity to be helped by realised souls—centres of self-illumination through trans-sensual, trans-intellectual, intuition and mystical experience—to see the greater profoundness and greater permanence of the knowledge contained in such mystical literature. As a classificationist, I was also led to see the unhelpfulness of mixing up embodiments of intellectual knowledge with those of intuitive knowledge. This experience is described in full detail in the *Memoirs* of the Madras Library Association, 1940, 121-146. A summary of this is also reproduced in "chapter Δ " of edns 2 (1939) to 4 (1952) of CC. The international symbol " Δ " was used to represent the new main class "Mysticism". Its ordinal value was fixed so as to lie between those of "M" and "N." This interpolation of a Greek letter amidst Roman letters was done without any thought to the resulting mixing up of two species of digits. In

reality it amounted to a new venture, unconscious though it was.

4 POSITIVE MAIN CLASSES

All along the need for certain partially comprehensive generalia classes had been felt. For example the periodicals demanded the classes Mathematical Sciences, Physical Sciences, Humanities cum Social Sciences, Humanities, and Social Sciences. Even books demanded the last three classes. By 1952, the above-mentioned unconscious new venture came to be examined consciously. This showed the way to represent these partially comprehensive, generalia classes by appropriate Greek letters. This freedom led to the opening of another main class "λ Animal Husbandry". Previously in spite of this subject having become an autonomous main class, it was denied an independent digit of its own by the narrowness of the base of Roman capitals. The Canon of Helpful Sequence demanded a place for these new generalia and main classes among the already existing main classes. These main classes may be called "Positive Main Classes" on the analogy of Compté's Positive sciences. These new main classes are tabulated in section 81 of paper 1.11 of D. B. Krishna Rao.

5 Preliminary Main Classes

The new main classes enumerated in edn 4 (1952) of CC and reproduced in section 13 of this paper are not Positive Main Classes. The main classes "3 Book Science" to "7 Biographology" and "93 Communicationism" to "972 Indexing" are not concerned with disciplines comparable with any of the traditional Positive Main Classes represented by capital letters. These are disciplines concerned with the process of embodying any item of knowledge in its subtle body—language, symbolic or phonetic, and expository form. It may be remarked here that the process of embodying the subtle body in gross physical body is accommodated in "M Useful

Arts". For example, "Book Production" is accommodated in "M1", "Production of gramophone records" in "MC3" and "Shorthand" in "MP". Coming back to the new main classes, those forming "8 Institutionology" and its subdivisions concern the discipline of organising and maintaining institutions for the development of knowledge in positive main classes or their sub-classes. Thus, the new main classes represented by Arabic numerals may appropriately be called "Prels" (=Preliminaries).

51 UNIVERSE OF KNOWLEDGE

By 1945, diving deep into the foundations of library classification had induced in me a certain feeling. Library Classification was being raised on superficial foundations. The frequent cracks and even breakdown and abandonment were caused by such poor foundations. Library Classification has essentially to be based on Knowledge Classification. It should therefore be founded on a proper survey and close study of the structure of the Universe of Knowledge. This universe is a continuum. It is not a static one. It is a dynamic continuum. Its structure is therefore ever changing. Hence it is not sufficient to know its structure at the present moment. On the other hand we should understand its mode of development. A knowledge of this will secure a greater stability to the foundation of library classification than a mere knowledge of the structure or, as it largely happens today, a rule of thumb partial reconnoitering of only those subjects as are actually found embodied in books.

511 Scope

The new main class "1 Universe of Knowledge" has for its content the structure and mode of development of the Universe of Knowledge. It is not concerned with Psychology which seeks to explore the happenings to the mind in building up knowledge. Nor is it concerned with Logic which deals with the way in which intellect develops the impressions and

experiences stored in memory and creates new impressions and experiences, thus adding to knowledge. It is not again concerned with Epistemology which deals with the location of the sources of knowledge either outside or inside the skin, and with establishing the relation between them if both exist. Similarly, it is not concerned with Ontology which deals with the "existence" of the objects and with their reduction to the minimum number of ultimates. As stated already, the main class "1 Universe of Knowledge" concerns itself only with a description and assorting of the regions in the universe of knowledge, its structure which marks out the regions, the ever-happening changes in the boundaries of the regions, the oft-happening interlacing of the boundaries, and above all the position, within the structure of the new regions thrown forth from time to time. There is no well-recognised or well-cultivated discipline dealing with this branch of knowledge, that has already established itself as a Positive Main Class. From 1947, this terrain in the Universe of Knowledge is being explored, charted and cultivated in the M.Lib. Sc. class of the University of Delhi. The findings may shortly be embodied in a book.

52 LIBRARY SCIENCE

The main class "2 Library Science" included in the Prels deals with the entire universe of knowledge even as the new main class "1 Universe of Knowledge" does. It is concerned with the collecting together of all recorded knowledge, its organization, its arrangement in a helpful sequence its listing, and its service to the community at large. It takes, the entire universe of knowledge within its purview even as the other main classes included in the Prels.

53 USE OF OCTAVES

The result of the provision in edn 4 of CC is as follows. The first order array of the universe of knowledge has three regions: 1 Pre-First Octave; 2 First Octaves; and 3 Last

Octaves. The last octave is used for Positive Main Classes concerned with the traditional disciplines. The First Octaves are used for "Prels", the newly emerging Main Classes concerned mostly with the subtle-body-embodiment of the knowledge in the positive main classes, and the institutions connected either with the production of the subtle bodies or their display or service. The Pre-First Octave is used for the different forms of exposition of the "Generalialia", in the sense of their being partially or totally comprehensive of the array of main classes. Another idea occurs to me. Certain new disciplines are emerging. Examples are: General Semantics, Logical Syntax and generally the region covered by Whitehead and Russell in their *Principia mathematica*. These too pervade all the traditional main classes. But they pervade them in the soul or thought sphere and not either in the subtle body sphere as the Prels or the physical body sphere as the classes already indicated in "M Useful Arts". The Canon of Helpful Sequence would indicate a place for them, prior to the traditional positive main classes, but later than the prelims. The Penultimate Octave in the first order array of the universe of knowledge answers this admirably. Till now we had been put to much trouble in accommodating them. I sought to accommodate them in Logic, in Mathematics and in a class prior to Mathematics. The first two did not give the necessary facilities to fit the disciplines with appropriate facet formulae without clumsiness. But their being represented by two digits in the Penultimate Octave makes this possible. It seems to me that the term "Prolegomena" used in UDC should really belong only to these Penultimate Octave Main Classes.

6 History

61 DC

DC had recognised "Library Science" as a "Prel". It accommodated it in its generalialia class. It gave it the number "02". All the other classes in the generalialia were

merely "Form Classes". These Form Classes were made to accommodate the embodiments in diverse subtle bodies. They did not concern themselves with the discipline of building up these subtle bodies. The reason for this is obvious. In the seventies of the nineteenth century there was hardly any book dealing exclusively with these disciplines. But there were books on Library Science.

62 SC

SC appears to have had a flash of short duration, as it were, of the possible existence of most of the disciplines enumerated as Prels. For, in page 11 of edn 3 (1939) it reads:

"A **Generalia**.—The divisions of this main class comprise most of the rules, methods and factors which are of general application, and which qualify or pervade every branch of science, industry or human study. They are universal and pervasive and cannot be logically assigned to any other single main class as peculiar or germane to it."

But the flash appears to have been of all too short a duration. For, by the time we reach page 20 we land on the following:—

"17.A **Generalia**—Nos. A000 to A070 are for universal works only, general cyclopaedias, periodicals, museums, collections, etc."

—just the form divisions of Generalia.

The generalia of SC includes also physical embodiments. These are all found in "AO". Then follow:

- | | |
|----------------|----------------------------|
| A1 Education | A6 Graphic and Plastic Art |
| A3 Logic | A7 Graining |
| A4 Mathematics | A8 Brasses. Bronzes. |
| A5 Geometry | A9 General Science |

The above allocation of the divisions of 'A' distinctly proves the failure to implement the brilliant flash-idea contained in page 11 of the book and quoted at the beginning of this section.

63 UDC

UDC began well by prefixing to the generalia of DC the main class "00 Prolegomena. The general fundamentals of knowledge and culture", as given in *Udc*, abridged Eng edn (1948). The second sentence in this term does not occur either in the French edition of 1927 or the complete Eng edn (= international edn 4) 1943. It is the occurrence of the term "culture" that has thrown this important class out of focus. It has also made it overlap with what belongs to one of the positive main classes recognised by convention. Perhaps this was due to the fact that the core DC did not have a proper place for either "Culture" or its major class "Sociology".

631 Detailed Divisions

The following divisions occur in the first order array of "Prolegomena" in UDC. The names of the subjects found in each of the three editions, are given in parallel columns:

UDC No.	Name of Subject in		
	1927 edn	1943 edn	1948 edn
001	Science and knowledge in general. Scholarship, learning. Organisation of intellectual work.	Science and knowledge in general. Organisation of intellectual work.	The sciences and knowledge in general.
002	Documentation.	Documentation.	Documentation.

UDC No.	Name of subject in		
	1927 edn	1943 edn	1948 edn
	Books, writings and literary art.	Books, manuscripts and authorship.	Generalities concerning compilation, sorting and mechanical arrangement of documents.
003	Writing. Graphology. Graphic symbols.	Writing. Graphic characters.	Writing.
004	Intellectual workers Men of letters, authors, men of sciences, experts. Liberal professions.	(Omitted)	(Omitted)
005	General methodology. Study-technique. Analysis, synthesis, methods and classification of knowledge in general	(Omitted)	(Omitted)
007	Action and organisation in general. Human work.	Action and organisation in general. Human work.	Activity and organisation in general. Human work.
008	Civilisation. Culture. Progress. Mankind in general.	Civilisation Culture. Progress.	Civilisation. Culture. Progress.
009	(Omitted)	Mental sciences in general	The Humanities. The "Arts" in general.

632 Remarks

1 The instability in the verbal plane disclosed by the above table shows that the most helpful content of "00 Prolegomena" is still eluding.

2 A comparison of the divisions of higher order show the instability and lack of hold over the helpful content even more.

3 The main class "003 Writing" can with appropriateness form an isolate in the main class "Linguistics".

4 As stated already, the content of "008" should really be housed in a main class.

5 The unsettled condition is at its worst in "009". For it represents "mental sciences." It is too vague. It can of course be taken to cover the entire universe of knowledge. But in the 1948 edn it had been changed to "Humanities". Then it does not deal with the entire universe of knowledge. It is only a partial comprehension of main classes. This has been already indicated in section 4. It should not therefore come in the "Prolegomena."

7 Work To Be Done

Facet Formula has been worked out for "2 Library Science", the oldest prel main class, started even in DC. But the other prels have not yet been fitted with facet formulae. "Journalism" came to be recognised as a prel main class during the last half a century. Before the concept of prel was evolved, it was provisionally accommodated in Useful Arts. "Museology" too has taken shape in recent years. These and the other prels are too recent. We have not got much of literature on them to disclose the structure and development of these regions of knowledge. But they are growing. Their facet analysis awaits to be done.

LIBRARY SCIENCE

PAPER 1-19

LIBRARY SCIENCE

S. Ramabhadran, K.M. Ujlamkar, V.S. Moghe, K.A. Isaac

[Makes a critical examination of the schedules given for "2 Library Science" in edn 4 of CC. Suggests amplification of the schedule in several places. Mentions also cases calling for second and third level of [P]. The table of isolates gives CC No. as well as UDC No. These disclose the higher autonomy accruing to the classifier if an expressive analytico synthetic scheme backed by scheduled and unscheduled mnemonics is used instead of a totally or partially enumerative one without facet analysis and mnemonics].

0 Introduction

For depth-classification needed by documentation of Micro-Thought, the facet formula prescribed for "2 Library Science" in edn 4 of CC needs to be augmented by the addition of Optional Facets belonging to different Rounds and Levels. This is but natural. In fact this happens in every subject. Work is already in progress on it. It is now too premature to give the results. We are here mainly concerned with the facets [P], [M] and [E] already scheduled in edn 4. We are critically examining the enumerated isolates. Some new isolates are added. Some arrays are also added. The need for opening new optional facets as levels and rounds will also get indicated.

In UDC 02 is library science. In the tables, the digits 02 are omitted in giving UDC Isolate Numbers.

1[P]

11 [P.1]

CC No. Isolate		UDC No.	CC No. Isolate		UDC No.
1	Trans- local		5	Subscription	7.3
2	Local	7.4/5	6	Special class	7.6
3	Academical	7.7/8	7	Private	7.1
4	Business	6	8	By Manage- ment	7.2+5
			95	Contact	

111 Remarks

- 1 The above isolates are "characteristic isolates".
- 2 The isolate "8 By Management" is found worth adding. Its sub-divisions may be as follows:

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
81	Government	7.5	816	Local	7.52
811	Central		88	Trust	
812	State			(Others by subject device)	

3 The isolate "95 Contact Library" was first explained in Ranganathan (S.R.) *Library development plan* (Delhi University publications, library science series 2), 1950, section 235.

"Its function should be to promote cultural Contact with a foreign country through the medium of books created spontaneously and circulated freely within the home country—books which blossom out of the hearts of the people and those which embody the outcome of their intellect. The fact that such books are patronised and read by the people of the home country is a guarantee of their veracity. They will have no stiffness or element of pose about them. They will have that respect for truth which Mahatma Gandhi had always insisted upon."

4 Since the mnemonic number "5" standing for "foreign country" has been already occupied in the first octave, 'Contact' is therefore provided in the second octave.

12 [P.2]

121 For [P.1] 1 Translocat

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
11	World		15	State	
13	Nation		16	Division	
14	Region				

1211 *Remarks*

1 Each of the above isolates is a "group-isolate". They are arranged in the descending order of their extent. Yet it is not a denudation leading to chain. In the context, the helpful way of arranging the group-isolates in array is to arrange them by the measure of their extent.

2 There is yet no "world Library" —a library serving the entire world. But it is an idea already engaging the thought of some. It is already being written upon. There is therefore need to provide a place for it.

122 For [P.1] 2 Local

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
21	District	7.53	22	City	7.52

1221 *Remarks*

1 The conventional term "Public Library" denotes "Local Library". In certain countries, it is managed by local bodies. In others—particularly in USA and Holland—it is managed by trustees. Problems about public libraries, not solely concerned with the management, will be placed here.

7 A common name for another species of "Public Library" is "Rural Library".

3 It is useful to have the following sharpened isolates.

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
211	Central		214	Library box	
212	Branch	2.15	218	Travelling	
213	Delivery Station	2.16			

4 A "branch library" has a permanent collection of reading materials. A "delivery station" does not have it.

5 A "library box" is a new type. The following description taken from *Library Literature*, 1936-39, P 409, throws light on it:

"A box has been provided at the Hale End (Walthamstow) Branch Library so that the borrowers may post their books on the way to the station in the morning, and collect new ones on the way home in the evening, the necessary recording being done by the library staff during the day."

6 Similar remarks apply also to "City Library".

123 For [P.1] 3 Academical

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
31	Elementary school	7.8	34	University	7.7
32	Secondary school	7.7	36	Research	
33	College	7.7			

1231 Remarks

1 Each of the above isolates may be further denuded according to local practice. For example, in India the following will be the divisions under "33 Colleges".

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
331	Intermediate		335	Post graduate	
332	Pass			(Others by subject device)	
333	Honours			(Illustrative)	
			33D	Engineering	7.7 :62
			33J	Agricultural	7.7 :63
			33L	Medical	7.7 :61

124 For [P.1] 4 Business

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
42	Industry	6:338		(Others by subject device)	
44	Newspaper office	6:07	4Q	(Illustrative) Religion	6:2
45	Commerce	6:38	4X8	Insurance	6:368
48	Government Department	6.354	4Y5	Public re- lation	6:354.36

1241 Remarks

1 The isolate "48 Government Department" stands for the library of a Government Department meant for the members of the Department. The fact of its being managed by government is not relevant here.

126 For [P.1] 6 Special Class

The CC Nos. in the following are taken from edn 4.

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
61	Child	7.6:087.5	65	Woman	7.6:396
63	Prisoner	7.6:365.64	68	Blind	7.6:362.4
64	Hospital	7.6:362:11	695	Sea-farer	

The scheduled mnemonics in [P] of Y is worth being observed. The above schedule may then be replaced by the following :

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
61	By age and sex		65	By birth or status	
611	Child	7.6:136.7	66	Abnormal	
612	Youth		664	Hospital	7.6:362.11
613	Old person		665	Prison	7.6:365.64
615	Woman	7.6:396	668	Blind	7.6:362.4
64	By occupation (To be divided by subject device)		6695	Sea-farer	

2 [P2] Department

A recent development is the organisation of a public library on departmental basis, such as technical library, music library and commercial library. In addition there are also the traditional departments—reference, lending, etc. These amount to (W) organ. These should therefore be accommodated in [P2]. Possible isolates in [P2] are :

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
4	Periodicals			(Others by subject device)	
6	Lending			(Illustrative)	
7	Reference		F	Technical	
75	Browsing		N8	Music	
			X	Commercial	

3[M]

31 [M.1]

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	By mode of production		5	By agency of production	
2	By script	:003.3	6	By age of production	
3	By language	:4	7	By edition	
4	By nature of publication		95	Translation	

311 Remarks

1 These isolates are "characteristic isolates".

2 An additional isolate "995 By nature of binding" is found necessary. Its subdivisions may be as follows:

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
9951	Unbound		9957	Cloth	
9953	Paper		9958	Leather	

32 [M.2] SECOND ORDER ARRAY

324 For [M.1] 4

By nature of publication

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
41	Reference	:025.5	46	Recreative	
43	Periodical	:05	47	Patent	
45	Newspaper	:07			

The following additional isolates are suggested :—

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
491	Micro thought		494	Pseudo classic	
492	Macro thought		495	Classic	
493	Pamphlet	:041			

36 [M.1] 6

BY AGE OF PUBLICATION

The isolate term "old" against "61" should be replaced by "Incunabula", a currently accepted term.

37 [M2]

The following schedule for [M2] is suggested :—

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
11	Wood		24	Bark	
13	Brick		25	Leaf	
14	Stone		27	Papyrus	
16	Metal		37	Textile	
183	Copper		38	Leather	
184	Brass		4	Paper	
185	Bronze		5	Film	

The isolates of [M2] need not be applied when it is the favoured material for an isolate of [M1].

4 [E]

41 [E.1]

The following isolates occur in edn 4 of CC

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Book selection		5	Technical treatment	
2	Organisation		6	Circulation	
3	Function		7	Reference service	
4	Co-operation		8	Administration	

411 Remarks

1 Isolates "2, 3, and 4" are common to other classes as well. They should hence be treated as Posterior Common Energy Isolates. The pre-first octave should accommodate them. That means the isolate numbers should begin with lower case letters. This has been done in section 5 of paper 1.16 by S. Parthasarathy. By releasing these isolates from [E], we secure more places for isolates special to Library Science. Therefore the following schedule may replace the one given in edn 4.

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Book selection	5.21	6	Circulation	5.6
2	Technical treatment		7	Reference service	5.5

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
3	Classification	5·4	8	Adminis- tration (Peculiar to Libra- ry Sc- ience)	5
5	Cataloguing	5·3			

2 The general office functions belonging to administration have already been omitted in the enumerated schedule. Evidently these were intended to be accommodated in the Posterior Common [E]. This supports our recommendation contained in remark 1.

3 In CC edn 4, [E] 8 Administration has apparently a second order Array. This goes against the conjecture that energy isolate is always single digitized. The proper course is to regard the apparent second Array as first order of [2P]. This is possible since the connecting symbol before [2P] should be omitted. This emphasises that a high "resolving power" is necessary to recognise manifestation of Personality in what looks like a second order of [E]. This can be got only by practice.

5. Conclusion

Experience has shown us the difficulty of implementing the concepts of Round and Level in Library Science. This indicates the need for working out an objective criterion for their application as Personality or Matter is necessary. This will certainly require a higher resolving power in the person concerned.

PAPER 1-20

AGRICULTURE

D.B. Krishna Rao

[Brings out an important correction in the idea plane brought about by the concept of (W) [P] and (\bar{W}) [P] *i.e.* of distinguishing the conditions for the formation of Array and of Level respectively. Illustrates the greater helpfulness secured by the use of [P2]. Brings out the illusion created in the past by the foci in [E] and [P2] appearing in the notational plane as if they belonged to a single train of characteristics. Brings out the unsolved problem in the notational plane caused by the use of alphabetical device to individualise species and variety].

0 Introduction

Intensive research in Library Classification is being conducted in Delhi. So far, several new concepts and a definite methodology are being developed in the Library Research Circle of the Indian Library Association. They are of use in depth classification for documentation work. In many main classes, microthought is now being classified with the aid of this methodology. Reciprocally such an application provides a test for the methodology in the classification of microthought. The following is a description of microthought classification in agriculture.

1 CC and Research

CC has published four edns since 1933 to 1952. Each edn has progressively incorporated new findings. Each edn has disclosed a new terrain for exploration and research. This will and shall have to continue. *Optional facets* (9) and (15) by S.R. Ranganathan, published in the *Abgila*, sum up the developments to date.

11 RIGID FACET FORMULA

CC started with a rigid facet formula for each basic class. This provided for only a limited number of facets. They were

all compulsory. Their sequence was fixed. This met most of the requirements of books (=macro thought) in agriculture in public libraries and in libraries of agricultural colleges.

12 OPTIONAL FACETS

But these were inadequate to meet the demands of documentation work. Necessity is the mother of invention. "Optional Facets" emerged in 1949.

13 APPLICATION

Consider the progressive sharpening of the basic focus J (Agriculture) in the following illustrative table.

Serial No.	CC No		Subject	UDC No.
	Before O.F.	After O.F.		
1	J	J	Agriculture	63
2	J378	J378	Tomato cultivation	635.647
3	J378u73	J378.73	Tomato cultivation in U.S.A.	635.647(73)
4	J378u73: N38	J378.73. N38	Tomato cultivation in U.S.A. in 1938	635.647(73) "1938"
5	J378 :4	J378 :4	Disease of tomato	635.647-2 or 635.647 :632
6	J378	J378,4	Stem of tomato	635.647 :581.44

- | | | | | |
|----|--------------------------|---------------------------|--|---|
| 7 | J378:44 | J378,4:4 | Disease of stem
of tomato | 635.647-2:581.
44 <i>or</i>
635.647:581.44:
632 |
| 8 | J378:4433 | J378,4:433 | Fungus disease
of stem of
tomato | 635:647-2.4:
581.44 <i>or</i>
635.647:581.44:
632.4 |
| 9 | J378:44332 | J378,4:4332 | Ascomycete (a
fungus di-
sease) of stem
of tomato | 635.647-2.421:
581.44 <i>or</i>
635.647:581.44:
632.421 |
| 10 | J378:
44332DD | J378,4:
4332DD | Didymella (an
ascomycete
disease) (=
stem rot) of
tomato | 635.647-2.421:
581.44 <i>or</i>
635.647:581.44:
632.421 |
| 11 | J378:
44332DD
:63: | J378,4:
4332DD
:63 | Chemical
treatment of
stem rot of
tomato | 635.647-2.421:
581.44:615.2
<i>or</i>
635.647:581.44:
632.421:615.2 |
| 12 | J378:
44332DD
:63B | J378,4:
4332DD
:63B | Bordeaux mix-
ture treat-
ment of stem
rot of tomato | 635:647-2.421:
581.44:615.2
BORDEAUX
<i>or</i>
635.647:581.44:
632.421:615.2
BORDEAUX |
| 13 | J378:
44332DD | J378,4:
4332DD | After-effect of
Bordeaux | 635.647-2.421:
581.44:615.2 |

:63B :94	:63B :94	treatment of tomato	BORDEAUX -099
			or 635.647 :581.44 :632.421 :615.2 BORDEAUX -099

Serial No.	CC No.		Subject	UDC No.
	Before O.F.	After O.F.		
14	J378	J378	Tomato (Fa- voured spe- cies— <i>esculen- tum</i>)	635.647
15	J378G	J378G	Tomato spe- cies— <i>glandu- losum</i>	635.647
16	J378G	J378G	Tomato varie- ty— <i>grandi- folium</i> of the favoured spe- cies— <i>esculen- tum</i>	635.647
17	J378P	J378P	Tomato spe- cies— <i>peruvia- num</i>	635.647
18	J378P	J378P	Tomato varie- ty— <i>pyriforme</i> of favoured species— <i>es- culentum</i>	635.647
19	J378PJ	J378PJ	Tomato spe- cies— <i>pimpine- llifolium</i>	635.647
20	J378PJ	J378PJ	Improvised variety— <i>ja- ponica</i> of spe- cies— <i>peruvia- num</i>	635.647

3 Facet *vs* Array

The facet formula for agriculture prior to 1949 was as follows :

$$J[U][P][C] : [F]$$

Here [F] the farming facet is a differentiating facet. Each focus in it is followed by its own further facets. The crop number was thus regarded as a compound number, made up of the three facets, utility or U facet, Part or P facet, and specific crop or C facet. It was so arranged that the significant digit in each of these three facets should be a single digit arabic numeral, of course other than 9. There was therefore no necessity for any connecting symbol between these facets:

31 NEW CONCEPT

Recent discovery throws overboard the above concept. U,P, C are now seen to be successive arrays in one and the same personality facet. They are not different facets representing different levels of [P]. Because, they relate to (W)[P] and not to (\bar{W}) [P]. In fact, the first two of the original facets contain only foci of characteristics. These are therefore to be accommodated only by successive arrays within [P]. Either idea in the idea plane produces the same result in the notational plane. The resulting illusion has been along blocking progress in the idea plane. The exigencies of documentation work laid it bare. The illusion got lifted only in July 1952. Therefore the explanation on the basis of either U, P, C or [P], [P2],[P3] is now seen to be on wrong lines.

32 THE RESULT

The crop in agriculture is a manifestation of (W) [P]. Its classification is based on a sequence of characteristics. These form a "train of characteristics." Each characteristic gives a new array. The isolates in each array are themselves either characteristic isolates or group isolates.

This view of the situation in the idea plane does not affect the resulting class number in its structure or appearance. However, it indicates an important corrective in the idea plane. This corrective helps us to carry individualisation of crops to a much deeper level. This is the chief benefit of the new clarification between (W) and (\bar{W}) (Organ).

4 Optional Facet

Class number for diseases of apples is J371 : 4. But the number for "Tomato in U.S.A." will have to be J371 : :73. Because, prior to 1949, the farming facet was compulsory. For the same reason, the number for "Tomato in United States in 1938" will be J378 : : 73.N38. The farming isolate is not required in the above two class numbers. But their absence is indicated by two consecutive colons. The emergence of the concept of Optional Facet helps us to overcome the need for this. Now we express only just the required isolates in the class number. The distinctive connecting symbol of each isolate indicates to us the facet to which the isolate belongs.

41 ECONOMY AND ELEGANCE

The newly constructed number secures economy in length of class number. They also make the number elegant. This became possible due to :

1 Evolution of the concept of " Fundamental Categories". Their role has already been described in paper 1.5 of Shri K.D. Puranik.

2 Prescription of different Connecting Symbols for the different fundamental categories. This has been expounded in paper 1.6 of Shri S. Ramabhadran.

42 REMOVAL OF RIGIDITY

The class number in the above subject demands only [P], [S], and [T]. Therefore the facet formula for this subject is simply J [P]. [S]. [T].

Each subject will similarly bring its own facet formula in its pocket. It won't be obliged to stretch itself into a previously laid rigid procrastrean bed of facets i.e. facet-formula. When edn 1 of CC was published, a reviewer said each subject brought its own Colon Class Number in its pocket. The present work on fundamental categories has enabled each subject to bring its own Facet Formula also in its pocket.

5 Round

The concept of 'Round' is of even more recent origin. It came to light in 1952. *Optional facets* (9) and (15) deal with it. It has entirely changed our concept in the progressive sharpening of basic focus just in the measure of the proliferation of the micro thought classified.

51 ROUND

In paper 1.7 of Isaac, it has been stated that energy digit alone can start a 'Round' within a class number. The Basic Class Number itself starts the entire class number as well as the first 'Round'. Therefore the number of rounds in the class number J378,4:4332DD:63B:94 is 4 ($=1+3$). This concept of 'Round' helps:

- 1 Segmentation of a class number into successive rounds ; and
- 2 Picking out the ideas that should come into each successive round according to their sequence, relevant to each class, guided by the principles directing the sequence of the fundamental categories.

Assessment of the several successive "Rounds" demanded by the component ideas of a subject and the formulation of appropriate optional facet formula have become possible. However, several problems relating to this have yet to be investigated and finalised.

6 Level

The concept of 'Level' has been described in detail with illustrations in paper 1.8 by V.S. Moghe. Before the recognition of 'Level' concept, the three arrays, utility, part and crop, all dealing only with (W) [P], were mistaken to belong to three different facets. But the concept of 'Level' has now shown the appropriateness of regarding the utility, part and crop merely as successive arrays in a single facet of [P]—i.e. to fall in one and the same 'Level' of personality manifestation. This clarification was not reached even in December 1952 when edn 4 of CC was printed.

61 ADVANTAGE

This has made it possible now to introduce a second level of personality [P2] between [P] and the succeeding [E], whenever a subject demanded it. [P2] is facet of organs arising in the first modulation stage of the dewholing of a typical crop-plant.

62[P2]

We shall now illustrate when exactly a new level or [P2] should be formed. Consider example 5 of section 2. Its subject is 'stem of tomato'. Here tomato is (W). Stem is (\bar{W}). Stem should therefore be taken to a new level of [P]. The number for stem of tomato is accordingly J378,4.

7 Remarks on Table in Section 2

71 CC

1 In examples 1 and 2, there is no visible effect in the class number, of regarding the isolate numbers 7 and 8 as belonging to different arrays instead of different facets.

2 Examples 3 and 4 illustrate the advantage of using a different connecting symbol for [S] and [T]. Before its use, the help of the lower case letter *u* had to be invoked. The resulting class thereby got anteriorised. This was not helpful.

In the present notation, the resulting class is left as a posterior division. This is helpful.

3 Example 5 shows that for macro thought of the extensive class 'disease of crop', the class number is left invariant by the present change in notational technique. In general libraries, classes of greater intension may not have books. Therefore the present advance in notational technique will not require much of change in class number in such libraries.

4 Example 6 shows the versatility gained by the notation by the use of optional facets. There was no means of individualising "stem of tomato" prior to the application of the concept of optional facet.

5 In examples 7 to 13, 'stem' was forcedly represented in the second order array of the energy facet in the old notation. This was a fault. This was unhelpful. In the new notation [P2] takes charge of organs like "stem". Then only the energy facet comes.

6 The benefit of the new notation mentioned in the previous remark is far reaching. It is now possible to bring together all the literature on the "stem of tomato"—be it morphology, physiology, disease or evolution embryology. Here is the table for them :

CC No.	Subject	UDC No.
J378,4:4	Pathology of tomato stem	
J378,4:92	Morphology of tomato stem	
J378,4:93	Physiology of tomato stem	
J378,4:96	Evolution of tomato stem	
J378,4:97	Embryology of tomato stem.	

7 In examples 8-13, it must be remembered that the first digit 4 alone after the colon belongs to [E.] The digits, succeeding that 4, belong to [P2]. They form the *Karana* or *Sahaya* (= agency or aid). Generally speaking we are able to enunciate now that a *Karana* can come only in the second and later rounds initiated by an energy focus. We have not yet succeeded in stating what other role [2P] can play.

8 The digits in the [2P] of example 11 are interpreted as follows:

3	= Parasite
33	= Fungus
332	= Ascomycete
332DD	= Didymella (= Stem rot)

The use of the international terminology in the alphabetical devise instead of the popular English terminology has been explained in *Classification of agriculture* by D.B. Krishna Rao in *Abgila*, 1, 1950.

9 Example 11 introduces [2E]. The focus in it is 63 (=Chemical treatment).

10 Example 13 introduces [3E]. The focus in it is 94 (=After-effect).

11 Examples 14 to 16 illustrate the addition of arrays of higher orders than three in P. The addition of the array of order 4 brings together all the literature in any particular Species other than the favoured one *Lycopersicon esculentum* (= J378).

12 The addition of array of order 5 brings together all the literature on any particular Variety of the species.

13 The examples 15-18 deal with different Species and varieties of tomato.

14 J378 mentioned in example 2 is itself a Species of tomato and not tomato in general. It is really species *esculentum*. To emphasize this, example 2 is repeated as example 14, bringing out this fact.

15 The species *esculentum* has more literature on it than any other species. It is therefore 'the temporally favoured species'. To satisfy the Law of Parsimony, incidentally this puts it at the beginning of all the species of tomato. This propitiates the canon of Helpful Sequence. We denote it by bare J378 without the addition of a Species Digit.

16 This convention denies its legitimate number for a book treating of all or many species of tomato. Convenience and the sparseness of books of that nature together indicate the accommodation of such books just before those dealing with the non-favoured species. The last number in the penultimate octave answers this admirably. The number for such a book will thus be J3789Z.

17 The examples 15-20 illustrate the representation of Variety, a further step in taxonomic grouping. Alphabetica, device is used.

72 UDC

1 CC and UDC numbers move with equal versatility down to example 5.

2 In example 6, 'Level' concept in CC enables it to provide for "stem" in an economical way in [P2]. But this technique is absent in UDC. It has to bring in "stem" only by the crude phase device.

3 In examples 7 to 13, two alternative UDC Nos. are given. Both practices are current.

31 In the first alternatives the above-mentioned circumwinded way of introducing "stem" causes even greater

unhelpfulness. The locus of the disease is "stem" and yet, attaching "2" disease to the number for tomato produces the impression of the whole tomato being the locus of the disease. The number for "stem" has only to be loosely attached after the number for disease. This does not secure adequate expressiveness.

32 In the second alternative, the more perimorous device of "special analytic divisions" is abandoned, in order to provide for "stem" prior to "disease". The resulting arrangement is more helpful. This instinctive abandoning of "special analytic divisions" to secure a more helpful sequence implies an unconscious recognition of the validity of the "Principle of Decreasing Concreteness" in facet formula, forming a fundamental principle in CC technique.

4 Practitioners of UDC, however, appear to leave out altogether the organ that is the locus of a disease. In *Horticultural abstracts*, 18, 1948, entry 1005, the class number of "current shoot borer" is 634.722-2.78. This means only "pest of current crop" as a whole. "Shoot" is not represented in it.

5 In examples 11 to 13, I have provided for "chemical treatment" by phased notation using 615.2 for "inorganic chemical treatment" and individualised "Bordeaux mixture" by adding that word at the end. The sanction for this is found by analogy of the devise of verbal individualisation prescribed and used in classifying "literature," "periodicals," "localities" etc.

6 UDC practitioners however leave out not only "organ" but also "chemical treatment". For example, in *Horticultural abstracts*, 18, 1948, entry 973, the class number for "Arsenate of lime for the control of (Apple) scab" is 632.42:634.11. Literally this means only "Fungus disease Apple".

7 In example 13, I have provided for "after-effect" by addition of the analytical subdivision ".099". This has

been taken from the analytical subdivisions of "615 therapeutics etc."

8 Whenever the drug is not individualised by UDC practitioners, we cannot expect "after-effect" to be reached by them.

9 In examples 15-20, UDC has not yet provided numbers for all the species of tomato. Generally it appears to individualise species by favoured category device and not by alphabetical device as CC does. Therefore the classifier has no autonomy in the matter. The published edn of UDC mentions only the following under "635.64 tomato".

635.64	Tomato
635.64	Aubergene (=egg plant=brinjal)
635.647	"Tomato fraise"
635.648	Okra, (= lady's finger = vendai)

These three do not even belong to the same botanical family. This is, however, an aside.

9 As coextensiveness is either not reached by UDC or reached by very clumsy methods, it is not fair to compare the average number of digits in CC and UDC number in this case.

8 Unsolved Problems

81 ARRAY OF ORDER 4

The capital letters, due to alphabetical device, at the end of class numbers in examples 15 and 16, create a problem. The capital letter G, in example 15, is furnished by the international name *glanduosum* of a non-favoured species of tomato. But the capital letter G, in example 16, is furnished by the international name *grandifolium* of a variety of the favoured species *esculentum*. Thus J378G becomes a homonym. This is a fault. We have to find a notational device to overcome this fault. This is an

unsolved problem in array of order 4. The same problem is illustrated by examples 17 and 18.

82 ARRAY OF ORDER 5

A similar problem arises also in array of order 5. This is illustrated in examples 19 and 20. *Pimpinelli-folium* and *peruvianum* are two species of tomato. Each has P as its first letter in its international name. According to the rules of alphabetical device the former is represented by J378P and the latter by J378PJ. Example 18 is taken to be the improvised variety *japonica* of the species *peruvianum*. Accommodation of the variety digit in array of order 5 leads to the number J378PJ. Thus the fault of homonym arises. This awaits solution.

83 GENERAL PROBLEM

The unsolved problems mentioned in section 81 and 82 may be put in general terms as follows :—In any last octave of an array, any isolate number is got by Chronological or subject or Alphabetic Device. In either case, the number of digits in the isolate number is not fixed. Therefore, unless it is the last array, this creates a homonym. This problem needs to be pursued and solved in the notational plane.

PAPER 1·21

AUTHOR ISOLATE IN LITERATURE

R.S. Goyal

[Points out the difficulty of constructing author numbers in contemporary Indian literature by chronological device. Suggests the use of chronological device upto century and the alphabetical device thereafter, in the case of authors without information about date of birth].

1 Introduction

This paper comes of the difficulties in classifying Hindi Literature according to CC (=Colon Classification). CC individualises a literary author by his year of birth. This

could not be found for most Hindi authors. Full literary histories and biographical dictionaries do not exist at present. This made me feel helpless. But a librarian should never feel that way. I groped for solution. It came to me. This solution is discussed in this paper.

2 Examples

I give a select list of Hindi authors whose years of birth could not be traced out:

HARIDASA	UMAKANTA
DHABAMADASA	KAPOOR (Shayama Narayana)
BODHA	KESHAVA SINGHA
KARNA KAVI	DIKSHITA (Madanmohana Lal)
UTTARA RAMA	NIRMALA
RAJARAMA	PANDEYA (Gangaprasada)
GADHADHARA SINGHA	PRABHABATI DEVI
PANDEYA (Tara)	MISHRA (Gangaprasada)
AGRAWALA (Raja Rama)	

3 Current Practice

31 UDC

UDC (=Universal Decimal Classification) had deviated from even the little helpfulness which the preliminary grouping by centuries was given in DC. It straightaway individualises an author by his full name. The authors in the literature of a language are thus arranged in one alphabetical sequence. Authors of one period get scattered. New authors may get earlier position than older ones. To illustrate, Kabir, Jayasi, Mira Bai, Sur and Tulsi of the medieval period will get scattered amongst modern writers such as 1 Haribash; 2 Jagannath Prasad; 3 Jayashankar Prasad; 4 Miland; 5 Shukla; and 6 Upadhyaya. A research scholar will not get the best help from it. Even to an ordinary reader this may not be an unmixed good. Works with totally different cultural and historical ethos as background will be thrown together promiscuously. This

will be jarring even to a reader who seeks only recreation or inspiration.

32 DC

DC (=Decimal Classification) first groups authors by their epoch. Within each group, it allots the first eight digits to prominent authors in a chronological sequence. It throws together all the rest of the epoch in "9" without any individualisation. An obvious improvement will be to form a second octave of author isolates for authors of the next rank in prominence. But this would involve too flagrant a violence to the Canon of Reticence. A more satisfactory method may be to arrange all of them either by the alphabetical device or by the chronological device.

33 CC

CC (=Colon Classification) arranges the authors, belonging to each of form of literature in each language in a separate chronological sequence. It uses the year of birth for individualisation. To illustrate, the authors given in section 31 will be represented as below :

CC No.	Hindi Author Isolate	UDC No.
100	Kabir (b. 1400)	Kabir
120	Jayasi (b. 1420)	Jayasi
149	Surdas (b. 1479)	Surdas
J32	Tulsi (b. 1532)	Tulsi

This is no doubt helpful. But it becomes unworkable when year of birth is not known. There is no source-book giving years of birth of contemporary Hindi authors and even of those of the two preceding generations. To postpone classification on the ground is to violate the Laws of Library Science. We have therefore to think of alternative isolate numbers for authors.

41 FIRST ALTERNATIVE

The author concerned may be approached for his date of birth. He may be approached directly or through the publisher. The approach may be individual letter or a collective letter in the daily press. This can ease our situation to a great extent, if the response is immediate. But, the response is found to be otherwise. Either there is no response at all, or if there is, it is too, too slow. It is also difficult to find out the correct address of individual authors. Here I may give the experience of Dr. Ranganathan in this respect when he was in Banaras Hindu University Library. He started requesting authors through the press, to communicate years of birth. Repeated requests were made. But only a dozen authors supplied the information. Even this took a very long time.

42 SECOND ALTERNATIVE

The second alternative is to graft into CC the methods of UDC and DC.

It is definite that the century of birth can be known correctly in the case of most authors and certainly of all modern authors. Even this will be impossible only in a negligibly small number of cases. The grafting suggested is as follows:—

- 1 For an author with known year of birth, construct the isolate number wholly by chronological device.
- 2 For an author with known century of birth, construct the isolate number by the successive application of chronological and alphabetical devices. The chronological number should be worked only to one digit.

43 RESULT

The result will be as follows:

The author isolates will fall into century groups in the

first order array. In each century group, there will be two sequences :

- 1 A chronological sequence. This is final.
- 2 An alphabetical sequence. This is provisional.

5 TRANSFER

As and when the year of birth of an author is known, his name should be transferred from the alphabetical to the chronological sequence. This transfer will involve clerical work. But this cannot be helped. This wastage of clerical time and labour is not caused by professional incompetence or negligence. It is caused by the facts occurring in the world. Inertial professional conscience may suggest "Why all this bother? Why not follow the UCC practice of permanent alphabetical sequence." This selfish pursuit of the easiest line of action will bring the curse of Library Science. The profession should not trade on the ignorance of the reading public of their rights and of what all could be done by the profession to make their works easy.

6 Appeal

This problem discussed in this paper is not peculiar to Hindi. It is found in all modern Indian languages. It is also found in many other Asian languages. I would appeal to my colleagues to experiment on these or other lines and report their findings in the pages of the *Abgila*.

PAPER 1-22

CLASSIFICATION OF LABOUR

P.N. Kaula

[Shows that the first order array of the energy isolate "9 Labour" in "Economics" in CC mixes up fundamental categories. Separates them and gives tentative schedules helpful for depth classification in labour literature].

0 Introduction

In X Economics of CC (=Colon Classification) that first order of array of the [E] isolate 9 (=Labour) is a mixed one.

This is a fault in design. Its incidence is due to the concept of Levels and Rounds not having evolved at the time of the first design of CC. The discovery of these concepts is less than a year old. These are now known to be one of the fundamental bases of classification. Sufficient advance was not made in these concepts in time for re-doing "Labour" in edn 4 of CC (1952). The object of this paper is to apply these concepts to "Labour". My documentation work in the Library of the Ministry of Labour of Government of India has thrown much light not only on the necessity but also on the efficiency of these concepts.

1 First Order Array

The following isolates in the first order array of [E] 9 are manifestations of [P]. They form [2P] (=Second Round First Level Personality).

- | | |
|-----------------|--------------------------------|
| 1 Labour system | 3 Skilled and unskilled labour |
| 6 Trade Union | |

The following are manifestations of [E]. They form [2E] (=Second Round Energy)

- | | |
|------------------------------|------------------------|
| 2 Labour market | 7 Strike |
| 4 Housing and labour hygiene | 8 Collective agreement |
| 5 Service condition | |

II SEPARATION INTO FACETS

This mixing of the fundamental categories [P] and [E] in one facet is unhelpful. These should be separated out into two facets. The isolates in the two facets should be scrutinised and reestablished. Separation should necessarily begin at the idea plane. In the notation plane, due help should be taken from Scheduled and Unscheduled Mnemonics. The schedule should be redesigned isolate by isolate in this manner. Some of the isolates may be taken to [2P] and [2E] and some even to [3P] and [3E]. It should be remembered that the connecting

symbol need not be inserted before [2P]. It may be taken understood.

2 Isolates in [2P]

21 ARRAY OF FIRST ORDER

The Isolates in the first order array of [2P] representing various systems of labour can be grouped as in [P] of "Y Sociology", with necessary alterations. These are indeed Characteristic-Isolates. These may be enumerated as follows:

- | | |
|--------------------------|--------------------|
| 1 By age and sex ; | 5 By status ; |
| 2 By time ; | 6 By Abnormality ; |
| 3 By space ; | 7 By race ; and |
| 4 By service condition ; | 8 By union |

"Skilled and unskilled labour" need not be given a separate place among the isolates in the first order array. This can form a division of "5 By status".

Trade Union should certainly get a separate place. Union includes Labour Unions, Employer association and Employer-employee association. This isolate may be represented by "8" as shown above.

22 ARRAYS OF SECOND AND HIGHER ORDERS

1	By age and sex	141	Man
11	Child	145	Woman
111	Male	16	Pensioner
115	Female	161	Man
12	Adolscnt	165	Woman
121	Boy	2	By time
125	Girl	21	Permanent
13	Adult	23	Seasonal
131	Man	24	Part-time
135	Woman	26	Casual
1355	Married woman	3	By space
14	Old person	31	By place of work

311	Rural	52	By work
313	Urban	521	Foreman
315	City	526	Peonage
316	Mountain	53	By skill
317	Home	531	Unskilled
318	Convent	532	Semiskilled
33	By residence	533	Apprentice
331	Indigenous	535	Skilled
333	Emigrant	537	Professional
335	Immigrant	54	By occupation
336	Sternerment	541	Menial
3361	Frontier	542	Slave
4	By service condition	6	By Abnormality
44	Non-payment	61	Intelligent
441	Free	62	Imbecile
443	Constraint	63	Convict
4431	Force (By individual)	65	Prisoner
4437	Compulsory (By State)	68	Disabled
45	Indentured	681	Blind
46	Payment	7	By race
461	Salary	71	Negro
463	Piece-Work	(Others by Geographical and Subject Device)	
5	By status	8	Trade Union
51	By income	881	Employer
511	Low	882	Employee
512	Middle	883	Employer and employee
515	High		

3 Isolates in [2E]

31 HELP FROM LAST OCTAVE

Among the isolates in [2E], "Housing and labour Hygiene" will not need a place in First Octaves. They can be accommodated in the last octave. Their further divisions will

therefore be as in 'L Medicine'. For example:

X:9:L	Industrial medicine
X:9:L:4	Disease
X:9:L:44	Poison
X:9:L:4:1	Nursing
X:9:L:5	Hygiene
X:9:L:4:6	Treatment
X:9:L:47	Accident
X:9:L:547	Prevention
X:9:L:571	Housing
X:9:L:5711	Moisture
X:9:L:5713	Air
X:9:L:57141	Heat
X:9:L:57144	Cold
X:9:L:5715	Light

32 FIRST OCTAVE

The isolates in the first octaves of the first order of array of [2E] may be fixed as:

1 Labour market	5 Service condition
3 Labour relation	7 Productivity
4 Strike	8 Social security

323 Labour Relation

"Employer-employee relation" pervades the entire field of "Labour relation". This was made of a subdivision of a "collective agreement" in CC. The *International labour code* and other treatises on this subject show that collective agreement is one of the modes of promotion of labour relation.

"Collective bargaining" under "wages" in "Service condition" in CC. This is unhelpful. Because this also is a mode of promotion of labour relation.

"Trade dispute" arises when there is a break in "Industrial relation". Thereafter only negotiations for smooth-

ing the relation between the employer and the employee take place. Agreement through conciliation, through mediation etc. are attempted.

CC has placed "Trade dispute" which is [2E] under [2P] "Trade Union". Settlement of industrial dispute has been given a place under "Strike" and not under "Labour relation". This should be changed.

34 STRIKE

The edns 1—3 of CC did not include all the methods adopted by the employer to break the strike nor by the worker to continue it. The few isolates, that were represented under "Strike", were mixed. So it should be redesigned.

"Strike" calls for [3P] and [3E]. The kinds of strike form the isolates in [3P]. The methods adopted by employer and the employee to prevent and continue it respectively form the isolates in [3E].

341 [3P] Isolates

- | | |
|---------------|-----------|
| 1 Sympathetic | 2 General |
|---------------|-----------|

342 [3E] Isolates

- | | |
|-----------------------------|---------------------------|
| 1 From the side of employer | 3 From the side of worker |
| 15 Prevention | 34 Picketing |
| 16 Strike breaking | 35 Boycott |
| 164 Black listing | 36 Go-slow |
| 165 Lock out | 37 Stay-in |

343 [4P] Isolates

There is need for another level of Personality to represent Partial and Unsuccessful strikes. The isolates in [4P] facet will, therefore, be :

- | | |
|-----------|----------------|
| 4 Partial | 6 Unsuccessful |
|-----------|----------------|

35 SERVICE CONDITION

The isolates in "Service Condition" need regrouping and redesigning. New foci under "wages" are to be accommodated in a more helpful sequence.

Social security has become an independent and equally important concept among labour-problems. It should be given a separate place and not kept under "Service condition".

"Workman's compensation" is a social security measure. It should be placed under "8 Social security".

37 PRODUCTIVITY

"Productivity" is a subject of recent growth. It has produced and attracted much literature. There is no provision for this isolate in CC. At the documentation level I was put to difficulty by this lacuna in the schedule. X:9-28 was the isolate number I had fixed for this isolate with the aid of auto-bias device. Now that the whole schedule is being reviewed and redesigned in the light of new techniques, the following place is suggested for "Productivity" in [2E]

7 Productivity

38 SOCIAL SECURITY

Since the establishment of ILO, "Social security" has been receiving much attention by the government as well as by the employer for the welfare of labour. It includes various social benefits, compensation, and insurances. These isolates should be represented in a helpful sequence. These are:

8	Social security	86	Workman's compensation
81	Social assistance	88	Social insurance
813	Family	881	Unemployment
814	Dismissal	883	Occupational risk
815	Provident fund	885	Health

816 Retirement	8854 Sickness
8161 Allowance	8856 Hospital
8166 Pension	886 Old age
85 Social benefit	8865 Provident fund
851 Unemployment	8866 Pension
853 Injury	888 Funeral
854 Disability	8891 Survivor's (Widow's and orphan's)
855 Maternity	

PAPER 1-23

TAX

K.D. Puranik

[Gives UDC and CC schedules for Tax. Suggests additional isolates for [P]. Gives examples for [M]. Indicates problems to be solved.]

0 Introduction

Tax is mainly a source of public revenue. It is also an instrument of control of economy in general. It has therefore assumed an important place in modern economic system. The amount of literature on Tax is increasing. We are concerned in this paper with tax as revenue.

1 UDC

11 FRENCH EDN.

French edn (1927-1929) of UDC (Universal Decimal Classification) provides the following:

336.2 Fiscal regime. Taxes.

Analytical Subdivisions

.01 Theory, Nature, Definition.	.6 Business
.02 Subject of tax :State, Commune, Province etc.	.026 Relation between tax and tax basis
	.2 Measure of tax
.025 Taxable object :Basis.	.21 Fixed tax
.3 Person	.22 Proportional tax
.4 Thing	.23 Gradual and progressive tax
.5 Deed	.3 Allotment of tax

.4	Tax quota	.14	Collection through sub- scription
.43	Tariffs		
.027	Notification and deter- mination of tax. Means of notification. Re- gister.	.2	Privilege of Collection of taxes
		.4	Surtax, Supertax and suplements
.1	Direct investigation	.5	Provisional collection
.12	Cadastral system	.6	Balance of collection
.123	Nominative role	.7	Restoration of tax. Drawback
.13	Verified notifications		
.2	System of indices	.8	Anticipated payment of tax. Receipt, Visa, exemption from stamp duty
.3	Mixed system		
.5	Assessment of Taxable base. Taxable value		
.51	Commercial assessment	.03	Effects. Incidence of tax. Double taxation
.52	Assessment by unit of measure, by individual head, by measure, by weight, ad valorem	336-21 336-211	Direct taxes in general Tax on Real Estate and land
.53	Virtual assessment after some presumptions.	.1 .2	Land register Tax on land
.6	Variation of taxable base	.3	Tax on constructions Built properties
.7	Deduction, appropria- tion, discharge	.213	Relatively personal tax
.8	Exemption and reduc- tion. Privileges	:629.133	Automobile
.029	Collection of taxes	.1	Rental value
.1	Various kinds of collec- tions	.15	Collection by special Collector of tax
.11	Direct collection	.215	Tax on profits and wealth. Income tax. Scheduled taxes
.12	Collection through high- way rent		
.13	Collection through re- serve, at the source	.1	Occupational profits (Individual work)

.2	Business and industrial profits (Capital and Work)	.245	Mutation dues in general
.3	Economic profit (Capital only)	.246	Mortgage dues
.216	Strictly personal tax. Capitation	.247	Duty at Registry and Chancery
.22	Taxes on consumption. Salt tax	.248	Stamp duty and exemption
.221	Customs	.249	Succession duties. Notification of succession.
.222	Excise. Octroi. Interior customs-	.251	Legal costs. Duty on judicial costs.
.1	Manufacture tax	.252	Duties on institutions for the creation, circulation and negotiation of letters of credit and on banking operations
.2	Introductory tax		
.3	Circulation tax		
.4	Sales tax		
.23	Indirect taxes in general	.255	Levies in respect of particular services and for the use of public property. Taxes with special preference
.24	Various taxes		Tolls etc.
.241	Patents		
.242	Registration duty		
.243	Mortmain dues. Increment dues.		

12 ABRIDGED ENGLISH EDN.

Abridged English edn (1948) adds the following:

.023	Tax levying bodies	.223	General taxes on manufacture and consumption
.024	Taxpayers		
.217	Capital levy	.224	Taxes on luxuries
.218	Crises taxes. Taxes on war profits	.241.7	Entertainment taxes
		.26	Levies in kind

The structure, however, remains the same as that of the French edn.

2 CC

In CC (Colon Classification), Economics [P.1] 7 is Public Finance. In X7, [P.2] 2 is Tax. For the purpose of this paper we shall regard X72 as the Basic Class. The corresponding Basic Class in UDC is 336.2. [P] of X72 is

1	Poll	5	Profession
2	Property	6	Inheritance
3	Land	91	Sale
32	Irrigation	92	Stamp
4	Income	93	License
41	Investment	95	Custom
42	Government bond	96	Capital levy
43	Business	991	Death
44	Salary		
45	Foreign		

[E] of [P] is

1	Incidence	13	Progressive taxation
11	Equal taxation	2	Exemption
12	Proportional taxation	3	Distribution
124	Specific	32	Double taxation
127	Ad valorem	5	Effect on industry and commerce.

3 [P]

The following isolates are tentatively suggested :

CC No.	Isolate	UDC No.
1	Poll	16
2	Property	
4	Income	45
6	Capital	49
8	Social security	
91	Consumption	22
913	Excise	22

TAX

3

914	Sale	22:4
93	Stamp	48
97	License	
991	Direct	1
992	Indirect	3

31 REMARKS

1 UDC does not give number for "Property tax" except "Land tax". It does not give number for "Social security tax". Numbers for these will have to be got by phase relation. Facets would have been more appropriate and economical.

2 "Direct" and "Indirect" have been taken to third octave. They are not required for individualising a tax. There is generally only theoretical discussion.

4 [M]

Some taxes may require [M]. For example,

CC No.	Subject	UDC No.
X72 ; 555	Petroleum tax	336.2 :662.753
X72914 ; 5895	Sales tax on Paints	336.222.4:667.6
X72914 ; 5591	Sales tax on matches	336.222.4:662.53

5 [E]

The isolates in [E] will be the same as those given in Section 5 of paper 1.24 Income-tax.

6 Demonstration

Shri C.S. Krishnamurty in his paper 1.24 demonstrates as a sample, [P1], [P2], [2P], [2E] for X724 Income tax.

7 Unsolved Problems

Investigation will have to be made to see what levels and rounds of [P] and rounds of [E] are required by each tax. Their comparison later will indicate common isolates, if any. It will then be possible to know differentiated [2P] [2E] etc.

necessary for different taxes. Then only schedules for Tax can be finalised.

PAPER 1·24

INCOME TAX

C.S. Krishnamurti

[Demonstrates the setting up of Facet Formula with Optional Facets for "Income-tax". Gives for most of the possible facets illustrative schedules of isolates. Most of the tables are comparative tables giving CC as well as UDC numbers. Ends with a table of five examples of subjects with their respective CC and UDC numbers, and some reflections on them].

0 Introduction

In paper 1·23, Shri K.D. Puranik deals with the classification of "Taxation" in general. He has worked the isolates in [P.1] of "Taxation". "Income-tax" is naturally one of them. Its isolate number is "4" in CC. Its CC No. is, therefore, X724. Its UDC No. is 336.215. This paper deals only with "Income Tax". It attempts to add further arrays in [P]. It also attempts a sample facet formula for a few cases. We shall, for convenience, take X724 as the Basic Class in CC and 336.215 as the Basic Class in UDC.

1 [P.1] SOURCE

With source as characteristic, we get the following isolates in [P.1]

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
2	Property		93	For loss of	
3	Occupation	1		employment	
6	Interest	3	94	Restrictive	
8	Profit	3		covenant	
			96	Capital	

11 REMARKS

1 Many of the isolate numbers are derived by Unscheduled Mnemonics.

2 Income on Occupation as source may include salary, pension, wage, annuity, gratuity, fee, commission, perquisites (such as free quarters, free conveyance and free food) and share of profit in lieu of salary.

3 Income from a source is (W) [P].

4 The isolates in the above table are "group-isolates."

12 SHARPENING OF ISOLATES

The following table gives an illustrative sharpening of some of the isolates in [P.]

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
21	Land	336.211.2	611	Central	
23	House	336.211.3		Govern-	
31	Salary			ment	
32	Perquisite		612	Constituent	
33	Pension			State	
34	Gratuity		616	Local	
35	Commission			Authority	
38	Profit in		62	Bank de-	
	lieu of			posit	
	salary		64	Private in-	
61	Security			vestment	

2 [P2] PERSON

It is usual for an Income Tax Act to give a different treatment to different kinds of personality. We shall regard the isolates, based on "legal personality" as characteristic, as forming [P2].

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Individual	336.215.1	6	Local Body	
11	Single		8	Corporate body	
12	Married				
13	With children		81	Association	
			82	Industry	336.215.2
2	Joint family		85	Commerce	336.215.2
3	Partnership		86	Charity	
5	Alien		87	Learned	
51	Domicile		93	Non-resident	
54	Refugee				

3 [P3] SLAB

In modern practice the first slab in income is usually exempt from tax. The later slabs are taxed at progressively higher rates. This peculiarity leads us to regard a "Slab" as an "Organ". The isolates based on "Slab" characteristic therefore, form [P3]. The actual isolates are usually fixed by law and it varies from country to country and within a country from time to time. Whatever be the range of each slab, the isolate numbers for slabs may be progressively fixed as 1, 2, 3 etc. The isolate number for "Super Tax" may be uniformly taken as 97. Similarly the number for "Excess Profit Tax," may be taken as 98.

4 Residence

Usually residence or non-residence becomes a relevant factor in income tax. These may apply to all the classes of legal persons, illustrated in the table of section 3. This creates only dichotomy among the isolates mentioned in that table. It was therefore felt that it was not expedient to provide a new level of [P] for it. It is given a place in [P2] itself. Auto-bias device will do the needful.

5 [E]

The following table gives the isolates in (E)

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Jurisdiction		6	Assessment	.027.5
2	Exemption	.027.8	7	Shifting	
3	Liability		91	Incidence	.03
4	Deduction	.027.7	95	Effect	.03
5	Rate	.026			

6 [2P]

61 FOR [E] 4 DEDUCTION

The following are the isolates suggested:

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Initial allowance		7	Depletion	
2	Personal allowance		8	Double tax relief	.03
3	Family allowance		94	Bad debt	
4	Medical allowance		96	Contributors to	
5	Business expenses			charities and	
6	Depreciation			scientific research	

62 [2P] 7 SHIFTING

The following isolates are suggested:

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
1	Avoidance		4	Evasion	

7 Rounds of (E)**71 [2E] FOR [2P] 6 ASSESSMENT**

The following isolates are tentatively suggested :

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
3	Collection	.029	8	Appeal	
4	Refund	.029			

72 (2E) FOR [2P] 7 SHIFTING

The following isolates are tentatively suggested :

CC No.	Isolate	UDC No.	CC No.	Isolate	UDC No.
4	Control of evasion				
5	Discovery		6	Reassessment	

8 Examples

CC No.	Subject	UDC No.
X724	Income tax	336.215
X7242	Taxation of income from property	336.215.025:333
X7242, 82	Taxation of income from property of a business concern	336.215.2.025:333
X7242, 82:4	Deductions in the taxation of income from property of a business concern	336.215.2.025:333.027.7
X7242, 82:46	Depreciation allowance in respect of property of a business concern	336.215.2.025:333.027.7

LAW

9

9 Remarks

91 LENGTH OF CLASS NUMBER

Table in section 8 gives five subjects with their CC and UDC numbers. The average number of digits in CC is 7.6. In UDC it is 17.

92 REASON FOR LENGTH

In UDC phase relation has to be used where facets are required. This is because facets are not provided. This results in its numbers being long.

93 INDIVIDUALISATION

CC numbers individualise all the five subjects. In UDC number for the last one is not individualising. We have to use number for the fourth subject to denote the fifth one.

PAPER 1-25

LAW

E.D. Jayaram

[Compares Salmond and Keton as foundations for the Classification of Law. Suggests the sharpening of some isolates in CC. Suggests the inclusion of the Isolate "Document" in [P2]. Points out the appropriateness of regarding many of the [E] as [P3]. Recommends the transfer of certain isolates in the [E] of "Property" to [P2] "Contract" Sets up a revised [P3] for "Contract" and "Evidence". Sets up [E] for some [P] isolates].

1 History

For the traditional classification of law, we may take those of Salmond and Keton.

11 SALMOND

Salmond divides Law into Introduction including principles, sources, and interpretation, Conflict of laws, Public law and Private law. The second last is divided into Constitutional and Administrative law. The last is divided into Property, Obligation and Status. "Property" is further divided into Corporeal, Immaterial, Encumbrance and Succession. "Obligation" is divided into Contract and Tort. "Status" is divided into

gation" gives Contract, Torts, Bankruptcy and Company Status is separated into Domestic and Extra-domestic. It may be noted that

- 1 Person would come under Status ;
- 2 Criminal law under Private law ;
- 3 Conflict of laws under Municipal law ; and
- 4 International law is not included.

12 KETON

Keton, however, begins with International law as his first division. He differs from Salmond in placing Criminal law under Public law. He omits Status. His new groups are Family, Commercial and Maritime law.

13 DC and UDC

For library classification, DC (=Decimal Classification) is unhelpful for the following reasons :

- 1 mixture of facets ;
- 2 the inclusion of subjects like constitutional history in law ; and
- 3 geographical lopsidedness.

UDC too becomes unhelpful on account of its DC Core. Therefore, UDC numbers are not given in this paper.

14 CC

Most of these defects have been remedied by CC (=Colon Classification). This is largely due to its abandoning of the traditional enumerative method and using the analytico-synthetic method. But in edn 1, even CC took the facets in the wrong order. This was set right in edn 2. The facet formula was helpfully changed from

Z [Law] : [Community] to Z [Community] : [Law]

The practical application of CC, however, has given rise to various problems which are dealt with below :

2 Amendment to [P2]

These amendments have been suggested by actual books. Therefore, in most cases, the casual book is first mentioned. Then follows the discussion and decision.

21 LEGAL PERSON

Eversely (W.B.) *Law of domestic relations*, ed by L.I. Stranger-Jones. Edn 6, 1951.

In edn 4 of CC, the isolates in the first order array of "1 Legal Person" are

1	By age and sex	7	State
2	Family	8	Corporation
4	Slave	91	Idol
5	By birth and status	92	Church
6	Abnormal		

The book *Law of domestic relation* is not accommodated conveniently in any of those. Here we get some help from Salmond. He divides "Legal person" into Domestic (= Marriage, Parent, etc.) Extra-Domestic (=Infant, woman, lunatic, convict, etc.) The first is based on Fiduciary Relation. The second is based on Personal Capacity. Following this hint, the isolates in [P2] 1 Legal Person may be enumerated as follows:—

1	Legal Person	1228	Illegitimate child
11	By age and sex	128	Guardian and ward
111	Minor	13	By residence
113	Adult	131	National
114	Male	134	Person without nationality
115	Female	135	Alien
1151	Unmarried	1351	Domiciled
1152	Married	1354	Refugee
12	By fiduciary relation	14	By occupation
121	Marriage	141	Serf
1211	Husband and wife	142	Slave
1214	Concubinage	1491	Diplomatic staff
1215	Divorce	15	By birth and Status
122	Parent and child		(As in [P] 5 of Y Socio-
1224	Child by mixed marriage		logy excluding "Alien")
1225	Adopted child		

		166	Bankrupt
		167	Deaf and dumb
16	Abnormal	168	Blind
162	Illiterate	17	State
163	Lunatic		(The rest as in edn 4 of
165	Convict		CC)

On this basis, the book under consideration will get the CC No. Z3,12.

22 PROPERTY

221 Goodwill

23 Carter (R) *Registration of business name act, 1916*, Edn 3, 1926.

CC has no number for "Business Name". It is a species of "2671 Good Will". We have to divide it into

26711 Business name 26713 Location of business

The aspect of registration will be dealt with under "98 document".

225 Trade Mark

"Trade Mark" includes "Trade Name". This latter has no number in edn 4 of CC. A separate number is often required for it in documentation work. The number may be 26751.

229 Name

24 Linnell (A). *Laws of names, public, private and corporate*. 1938.

"Name" is a generic term which includes "Business name" besides "personal name", "honorific" and "title". A new number is needed to denote its generic sense. But books on the subject are rare. Therefore 26791 in the second octave was arrived at.

23 CONTRACT

Dold (Gilbert W.F.) *Stipulation for third party*. 1948.

This causes the need for a special number for the exceptional cases, mostly, of contracts entered into by persons in a fiduciary capacity. This does not arise often. It may be given the number 392 in the second octave.

26 CONFLICT OF LAW

Bentwich (N.) *Law of domicile and succession*. 1911. This book gives rise to the following problems:

"Conflict of Law" arises out of a foreign element in an action. It has three distinct divisions:

- 1 Jurisdiction
- 2 Choice of law
- 3 Validity of foreign judgments.

1 and 3 have been provided for in the [E] facet for 7 of [P2]. But 2, i.e., Choice of law, with which this book deals, cannot be given a number under the regular schedule. Because there can be no choice of law in common action as such. We may therefore have

DZ, 66 for Choice of Law.

But still co-extensiveness is not reached. Succession has not been provided for. There is a lacuna in the schedule. This will be dealt with later in section 498.

27 CAUSE OF ACTION

In CC we have as an isolate in [P2], "7 Suit". A "Suit" is really executive action. "Cause of action" will be a more suitable term. It emphasises the legal right enabling the institution of a suit or a complaint. "7 Cause of action" will apply to civil action as well as criminal proceedings. No further subdivision of "civil action" is called for. "Criminal

proceedings", however, call for the following sub-divisions:—

- 753 Summons case 754 Warrant case
755 Sessions case

28 COURT

There are a number of books specialising on the practice of different English Courts of Law.

- 1 Bentwich (N). *The practice of the Privy Council in judicial matters*. Edn 3. 1937.
- 2 Daniell (E.R.). *Chancery Practice* ed by Sydney Edward Williams and Frank Guthrie-Smith. Edn 8. 2V. 1914.
- 3 Chitty (F.W.). *Forms of civil proceedings in the King's Bench Division of the High Court of Justice* ed by Phillip Clark. Edn 6. 1931.
- 4 Tristram (T.H.) and Cotte (H.C.). *Probate practice* ed by Leader (E.W.) etc. Edn 18. 1940.
- 5 Phillip (E.A.). *Practice of the divorce* ed by Spicer (E.E.). Edn 4. 1951.
- 6 Roscoe (E.S.). *Admiralty jurisdiction and practice of the High Court of Justice* ed by Geoffrey Hutchinson. Edn 5. 1931.

In India too, there are distinct rules for practice for the appellate and original sides of High Courts and for the subordinate judiciary. Here is a suggested schedule.

Isolate No.	United Kingdom	India	Other Countries
811	Privy Council and House of Lords	Supreme Court	Supreme Court
812	High Court	High Court	
8121	Chancery	Appellate Side	

Isolate No.	United Kingdom	India	Other Countries
8122	Kings/Queen Bench	Original Side	
8123	Probate Divorce and Admiralty		
81231	Probate		
81232	Divorce		
81233	Admiralty		
813		Subordinate Judiciary	

292 SOURCE

Acharya (B.K.) *Codification in British India*. 1914.

An "Enactment" (CC No. 928) is an individual piece of legislation and an extension of this is the "Code". The latter has been described as "a text book enacted by the legislature." This will require a number. 9287 has been decided upon. "7" is mnemonic for "Personality".

294 EVIDENCE

Let us consider the following books:—

- 1 Wills (W) *Principles of circumstantial evidence*.

Combined English and Indian edn 7. English edn by V.R.M. Galtie. Indian edn by M. Krishnamachariar, 1936.

- 2 Tregarthen (J.B.G.) *Law of hearsay evidence*. 1915.
- 3 Sichel (W.S.) *Practice relating to witnesses*. 1887.

These books called for the following divisions of "94 Evidence" in the [P2]. These isolate numbers use unscheduled mnemonics.

941	By source	9441	Oral
9411	Direct	9448	Documentary
9412	Circumstantial	947	By Validity
9414	Hearsay	9471	Primary
944	By Channel	9472	Secondary

298 DOCUMENT

Norton (R.F.). *Deeds*. Edn 2. 1928

Kelly (J.H.). *Draftsman*. Edn 8. 1933

A new number "98 Document" is needed in [P2], to accommodate books of this nature.

3 Change from [E] to [P3]

The schedules enumerating [E] for the foci in [P2] should be regarded as schedules in [P3]. For, these are more like (\bar{W}) [P] Organ of their respective [P2] foci. The "Contract" is a manifestation of [P] in the context of "Z Law", so are "Capacity for contract", "Form of contract", "Formation of contract", etc.

4 Revision of [P3]

The following addition to or revision of the several schedules of the original [E], now regarded as [P3], is desirable.

42 FOR [P2] 2 PROPERTY

421 Pre-emption

Kathalay (D.W.R.). *Treatise on the law of pre-emption in British India (and other places)*, 1928.

"Pre-emption" was not provided for under "Property". The number 195 is now given for it. "5" is mnemonic for "Commerce" or "Sale and purchase".

426 Succession

Basu (N.D.) *Indian succession act*, 1946

Jarman (T.) *Wills*. Edn 7. 1930. 3V.

These books are illustrative of a legion of books on these subjects. Succession has no number under "Property". We may therefore give the following numbers. These follow unscheduled mnemonics.

6 Succession

61 Intestate

63 Testamentary

43 FOR [P2] 3 CONTRACT

1 Capacity	33 Consideration
111 Minor	4 Illegal
1152 Married woman	41 Statutory
135 Alien	411 Lottery
163 Lunatic	412 Wage
164 Drunkard	413 Stock exchange
165 Convict	414 Insurer
17 State	415 Money lender
18 Corporation	42 Immoral
181 Unincorporated association	43 Restraint of marriage
198 Executor and administrator	44 Champerty and maintenance
2 Form	45 Crime
21 Written	46 Restraint of trade
22 Oral	47 Against public policy
221 Executed	5 Voidable
222 Executory	51 Fraud
223 Implied	52 Misrepresentation
2231 By conduct	53 Condition and warranty
2332 By custom	54 Uberimae fidei
2233 By law (of quasi-contract)	541 Insurance
	542 Sale of land
	543 Suretyship and guarantee
3 Formation	544 Partnership
31 Offer	545 Company
32 Acceptance	55 Duress

6	Frustration	79	Judgment
61	Vis major	791	Breach
		792	Set off
7	Discharge		
71	Performance	8	Remedy
72	Payment	81	Damage
73	Accord	82	Specific performance
74	Release	83	Injunction
75	Alteration	84	Rectification
76	Death	85	Recision
77	Trading with the enemy		
78	Limitation	9	Assignment

47 FOR [P2] 7 CAUSE OF ACTION

1	Procedure	4191	Affidavit
2	Jurisdiction	4194	Commission for evidence
21	Forum	4195	Bail
22	Res judicata, Autrefois	4196	Interim relief
	acquitt, Autrefois con-	4198	Receiver
	convict	5	Trial
3	Institution	51	Burden of proof
4	Preliminary	52	Evidence
41	Pleading	521	Chief examination
4115	Process	524	Cross examination
4117	Communication to	526	Re-examination
	accused	54	Compromise
412	Written statement, Plea	6	Judgment
413	Discovery	61	Contested
415	Preliminary disposal	62	Consent
416	Production of document	63	Ex parte
417	Issue, Charge, Discharge	65	Award
419	Inter-locutory proceed-	68	Declaratory
	ing	696	Foreign

475 For [P2] 755 Sessions' Case

The following additional isolates are necessary:—

551	Committal proceedings	5534	Objection
5512	List of defence witness	554	Reading of committal evidence
5513	Committal	555	Inspection of place of occurrence
552	Session's Trial	557	Verdict of jury
553	Appointment of juror		
	494 For [P2] 94 Evidence		
1	Admissibility	3	Weight
2	Relevancy		

498 For [P2] 98 Document

1	Drafting	4	Rectification
2	Execution	5	Cancellation
3	Registration		

5 Formation of [P4]

51 For [P2] 7 [P3] 6 JUDGMENT

2	Partition	521	Mandatory
3	Specific performance	522	Restrictive
34	Restitution	6	Money
5	Injunction	61	Damage
51	By duration	62	Maintenance
511	Temporary	8	Probate
512	Perpetual	93	Arbitration
52	By nature	931	Award

PAPER 1-26

SYMBOLIC META LANGUAGE

S.R. Ranganathan

[Starts with the assumption that a scheme of classification is an artificial language. Discusses the difference in the learning of mother tongue and other languages. Develops the concept of "Medium Language" in the learning process. Describes the role of "Tool Language" in building Artificial Language. Shows the disturbance due to the use of

Natural Language as Tool Language. Makes out a case for the use of a Symbolic Tool Language. Describes the Symbolic Tool Language developed in Library Research Circle at Delhi for constructing classificatory language. Describes the role of Symbolic Meta Language. States the necessity for organising research in setting up such a language].

1 Artificial Language

A scheme of classification amounts to an artificial language. It is an artificial language improvised for the specific purpose of the mechanisation of the maintenance of a preferred sequence and the insertion of new categories in the preferred sequence, with a classificatory term of its own but without affecting the term denoting any of the already existing categories. Arrangement being the main purpose, classificatory language is appropriately a language of ordinal numbers. In other words, its phonemes are all ordinal numbers. This artificial language requires careful building up. It has to be developed and extended from time to time to meet new situations.

II DISQUALIFICATION OF NATURAL LANGUAGE

A natural language is disqualified to serve the purpose of classificatory language. This is due to the genesis of a natural language. The words in a natural language got created originally to express emotional impulses. The emotional impulses did not have any filiatory order among themselves. Therefore, question of helpful sequence among such early words could not have arisen. The transition from emotional words to intellectual ones was casual. It has been drawn out through centuries. Therefore words were improvised to express thought, in as casual a way as those for emotions. But among the possible sequences of thought, it is possible to pick out one as more helpful than many others. Among equally helpful ones, it is found necessary to prefer one, forcibly though it be. Every scheme of classification does it. The names of the categories in a natural language do not fall, when arranged alphabetically, in the same sequence as the preferred sequence of the thought represented

by them. It is too late in the day to re-design the words of a natural language to make the words fall in the preferred sequence. Even if they are so re-designed, as a natural language is the property of Mr. Everybody, there is no means of preventing their again being thrown into a form not parallel to the preferred helpful sequence of the categories representing them. For these reasons, a natural language is disqualified to serve as a classificatory language. A language of ordinal numbers, controlled by select experts and protected from interference by Mr. Everybody, has to be created to serve as classificatory language.

2 Learning Language

Any language is in reality a bundle of conventions. The conventions of a natural language began in pre-historic times. They are being varied and added to continuously. The variation and addition can be and are made by any member of the community using that natural language. On the other hand an artificial language should have originated only in historic times. Most current artificial languages have originated only in the near past. Their conventions are even more severe than those of a natural language. Their variation is controlled by a few experts. It is called an artificial language on account of these reasons. A natural as well as an artificial language have however this in common. They are both bundles of convention. There is nothing truly "natural" in them. The epithet "natural" and "convention" cannot go together. Any convention is artificial. Therefore there is need to "learn" a language—as much need to "learn" a natural language as to "learn" an artificial language.

21 MOTHER TONGUE

The learning of mother tongue begins even in infancy. It is learnt by Association and Imitation. Social pressure induces imitation of great intensity. The urge for survival

induces Association of great intensity. Success in the learning of a language is measured by the spontaneity of an expression in the language getting associated with the thought embodied in it and *vice versa*. The time-lag, if any, is a measure of the incompleteness of learning. Successful learning of a language implies inseparability of a thought and the expression embodying it. In his invocatory verse in the *Raghuvamsa*, Kalidasa compares this fusion of expression and thought to the fusion of Parvati and Parameswara. Psychologists have employed statistical method to measure the extent of successful learning of language in different ages. The following table is illustrated :

Years				No. of words learnt	
8	3,800
10	5,400
12	7,200
14	9,000
Average adult		11,700
Superior adult		13,500

According to Ballard, "between the ages of 8 and 14 (a person) increases his store of understood words at the rate of 900 words per annum. That is to say, the ordinary child learns the meanings of two or three new words every day". The above table shows that an average person learns one fourth of his words even before entering school. He learns three fourths of his words before emerging from childhood. These facets show that mother tongue is learnt without the mediation of any other language.

211 Standard Language

But even in the mother tongue, there is a Standard Language. This differs in greater or smaller degree from an

individual version of it and even from a region's version. While at school, a child is taught standard language. In learning it, his own individual version or the local version of his community is used as medium.

The mediating language in the process of learning—in this case the individual or local version of the mother tongue—may be denoted by the "Medium Language". In this case, the Medium-Language and the Standard Language appear to be very much alike, when viewed superficially. One does not feel much the burden of having to use two languages simultaneously. As an offset against this advantage, an unconscious mixing up of one's own individual or regional language and the jargon of Medium Language on the one side and the Object Language on the other, takes place. This leads to fallacy. This corrodes the correct acquisition of the Object Language—the standard language in this case. However, it is true to say that the mother tongue (entirely) and its standard form (to a large extent) are learnt more or less by "Direct Method" i.e. without the intervention of a totally alien tongue.

22 SECOND LANGUAGE

221 Wrong Use of Direct Method

The position is different in learning a second language—a classical or so called "Dead Language", or a modern language. A child living in a bilingual area often picks up the second language also by "Direct Method"—in the same way in which it picks up its mother tongue. It is not however so when a second language has to be learnt in a social setting where it is not current. It is even more so when it has to be learnt after the stage of childhood. Direct method is not effective in such a context. About fifty years ago, the direct method implied in the learning of mother tongue was sought to be forcibly introduced in the learning of a second language, the adverse context

described above. While undergoing training at the Teachers College, I felt the horror of this improper use of direct method.

222 Medium Language

Learning is made more comfortable through the mediation of the mother tongue of the learner. In other words, the use of the mother tongue as the medium language minimises the difficulties of learning a second language, when the facilities of living with the people using it as mother tongue do not exist. Here it must be conceded that the mediation of the mother tongue delays the incidence of spontaneity in associating thought with the expression in the second language. The longer this delay, the greater will be the faults in the use of the second language as an accurate medium of communication. The prescription is somewhat as follows: Begin with the use of mother tongue as medium language; progressively drop its use; aim to associate thought and expression in the second language without mediation by mother tongue or the medium language.

23 ARTIFICIAL LANGUAGE

The learning of artificial language by direct method is nearly impossible. Thought and its expression in artificial language cannot be associated and fused together without mediation by a natural language as medium language in the earlier stages. Artificial language can be used productively only after spontaneity is established between thought and its expression in artificial language and the need for medium language is totally eliminated. This can be attained only by persistent practice. This is a warning to learners. It takes time to reach the level of spontaneity. This is a warning to teachers.

3 Building Artificial Language

In a sense standard language also is an artificial language. No doubt its artificiality is slight. To get mastery of standard language, it is not sufficient to depend merely on the individual

or the local version of the mother tongue as medium language. A new language has to be improvised. It is improvised by grammarians. It consists of the technical language built by grammarians. We may call it "Grammarian's Jargon". The relation between the Grammarian's Jargon and the standard language needs attention. The standard language is a slightly artificial language. It is being built. It is the language forming the subject of study. The grammarian's jargon is a "Tool-Language" employed in building up and studying the standard language. In contradistinction the language being built or studied may be called "Object Language." In this case the Tool Language has got much in common with the Object Language. The script is the same. The syntax is often the same. The morphology is not very different. The essential difference concerns semasiology. Therefore the strain of the preliminary acquisition of the Tool Language is not felt. In fact it is not even recognised as different from natural language—either from standard language or an individual or local version.

4 Tool-Language

The distinction between Tool-Language and Object Language came to be recognised only in recent years. Even the distinction between the natural language and either of the above is only recent. The emergence of it is traceable to the view of mathematics as a language, taken by a class of thinkers of late nineteenth century. Frege was one of the first to do so. The first culmination of this was in the *Principia mathematica* (1910) of Whitehead and Russell. The chief contribution of this class of thinkers was disclosure of the dangers of using a natural language as Tool-Language.

41 REFRACTION DUE TO SUGGESTION

In a natural language a word has several under-tones and tones of meaning, in addition to totally different meanings. When it is uttered, it does not convey an identical meaning

to all. Frequently there is a slight shade of difference. This difference occurs not only as between hearers of the word but also as between them and the person uttering it. The result is "refraction of communication". Often the refraction is only slight. It does not take away far from the sight of the intended meaning. However, a chain of such refractions in the course of a continued communication leads to an utter failure of communication. In fact, the word emanating from the persons at the two ends of communication is no longer truly articulate to each other. It nearly becomes a "noise". This fault in the use of a natural language as Tool-Language in building an artificial language may be called "Refraction due to suggestion".

42 LAW OF PARSIMONY

In the development of an artificial language, several new ideas get created. Some of them are deep composite ideas. They first get expressed in terms of a number of simpler constituent ideas. Therefore the expression for a new depth-idea is very long. They have further to be repeated often. Their communication, therefore, requires a considerable time, and breath or writing. Moreover, the expressive multiworded terms representing them act as a distraction to the mind. For the constituent elements of the depth-thought are not often relevant. It is only the integrated whole that is relevant. Therefore there is also wastage of thought. This triple wastage of time, breath or labour of writing, and thought is repugnant to the Law of Parsimony. "Brevity" is necessary.

43 STRAIN OF THINKING

The strain of thinking—making inference or arrive at judgment—becomes great when the thinking is done through the medium of natural language. This amounts to saying that the communication of one's thought to oneself in a productive way leading to further thought becomes arduous. Everybody experiences it occasionally, when facing involved thinking. The

building up of an artificial language is like charting a totally foreign forest. The thought-masses to be developed and tidied up are often strange. They very often also become too voluminous. During the last twentyfive years, I had felt the cruciating pain of this experience in the course of building up the Colon Language. Again the demonstration to students and colleagues, of the progress of the thought involved in developing a classificatory language, is also most trying. The face of the audience has often clearly showed that my words had totally "missed the bus". This is due to the simultaneous incidence of :

- 1 A new mode of thinking ; and
- 2 A new region of thought.

The natural language blurs both the thought and the mode of thinking. Thus both in thinking by oneself and in promoting thinking in other's natural language causes considerable strain. One always feels the need for avoiding such a strain.

5 Solution

These faults in a natural language, used as tool-language, are being brought home to our mind in recent years in the weekly meetings of the Library Research Circle of the Indian Library Association. In the first few meetings, we felt almost totally lost. And yet we were only a dozen people. We had lived from 2 to 15 years together. We had been accustomed to each other's language. We had been accustomed also to each other's way of thinking. All this was of no avail when facing the building up of a progressive, dynamic self-perpetuating, artificial, classificatory language on a sound basis. It is this experience which led to the analysis of the difficulties mentioned in section 4. The solution is found in symbolic language.

6 Symbol

In a similar situation, our ancient logicians of the Nyaya School had sought to avoid the faults due to homonyms, and undertones and over-tones not amounting to homonyms, by

using "no sense" or the so called non-sensical words to denote oft-recurring new units or even blocks of thought. Adoption of such artificial words contributed not a little to the great progress made by the Nyaya School of Logicians. Again in later times, mathematicians and chemists had used even more "no sense" symbols to represent new, and even old, oft-recurring new units or blocks of thought. This made us think of using symbols—i.e. of developing a Symbolic Tool-Language. We have not yet developed it fully. We are still using both a combination of natural language and tool language. But even the small extent of the grafting of symbolic language has given considerable relief to the discussion in our Sunday meetings of the Library Research Circle.

61. SYMBOLIC TOOL LANGUAGE

The following is a glossary of the symbols in the Symbolic Tool-Language already improvised to make the building of the artificial classificatory language comfortable. The use of these symbols has eliminated much of the usual refraction due to homonyms, under-tones and over-tones, unavoidable in words of natural language.

61. FUNDAMENTAL CATEGORIES

611. Round, Level, Array and Octave

Symbol	Meaning	Symbol	Meaning
(FC)	Fundamental Category	(R)	Round
(A)	Array	(rR)	r th Round
(aA)	a th order Array	(rR.iL.aA.tO)	i th Octave of the a th Array
(L)	Level		of the i th
(iL)	i th Level		Level of the
(O)	Octave		r th Round
(iO)	i th Octave		etc., etc.

612 About Octave

Symbol	Meaning	Symbol	Meaning
(O)	Octave	(lO)	Last Octave
(fO)	First Octave	(pO)	Pre-First Octave

61E Energy

Serial No.	Symbol	Meaning	Serial No.	Symbol	Meaning
E1	(E)	(FC) Energy	E10	[E.7]	(2lO) of [E]=
E2	[E]	(E) facet. <i>alternatively</i> (1R) [E]	E11	[E.8]	(1lO) of [E]= Last Octave of [E]
E3	[E.f]	(fO) of [E]			
E4	[E.l]	(lO) of [E]			
E5	[E.p]	(pO) of [E]	E12	[2E]	(2R) [E] Second Round Energy Facet
E6	[E.1]	(1O) of [E]			
E7	[E.2]	(2O) of [E]			
E8	[E.3]	(3O) of [E]			
E9	[E.6]	(3lO) of [E]= Third Last Octave of [E]	E13	[2E.f] etc.	(fO) of [2E] etc.
			E14	eE	(eR) [E]

61M Matter

Symbol	Meaning	Symbol	Meaning
M1 (M)	(FC) Matter	M7 [Mm]	(1RmL) [M]
M2 [M]	(M) facet <i>alternatively</i> (IRIL) [M]	M8 [2M]	(2R) [M] <i>alternatively</i> (2R1L) [M]
M3 [M.m]	(mA) of [M]	M9 [2Mm]	(2RmL) [M]
M4 [M.m.f]	(fO) of (mA)	n10 [nMm]	(nRmL) [M]
etc.	of [M]	n11 [nMm.	(fO) of (1A) of
	etc.	1.f]	(n R m L) [M]
M5		etc.	etc.
M6 [M2]	(1R2L) [M]		

61P Personality

Symbol	Meaning	Symbol	Meaning
P1 (P)	(FC) Personality	P3 [qPp. 1.f]	(fO) of (1A)
P2 [P]	(P) facet. <i>alternatively</i> (1R1L) [P]	etc.	of (qRpL) [P] etc.

61S Space

Symbol	Meaning	Symbol	Meaning
S1 (S)	(FC) Space	S3 [S.1.f]	(fO) of (1A) of
S2 [S]	(S) facet	etc.	[S] etc.

61T Time

Symbol	Meaning	Symbol	Meaning
T1 (T)	(FC) Time	T3 [T.1.f]	(fO) of (1A)
T2 [T]	(T) facet		of [T] etc.

62 REMARKS

1 The alternative meaning of [E], [M] and [P] creates homonyms. But we are satisfied that in any given context one and only one of these two meanings will be intelligible.

2 It is found that

21 (E) can have (R), no (L), no (A) but (0).

22 (M) and (P) can have (R), (L), (A) and (0)

23 (S) and (T) *qua* (S) and (T) can have no (R), no (L) but (A) and (0).

63 GENERAL CONVENTION

The following conventions will be adopted in the use of brackets :

- 1 Bare letter or number without brackets for " Digit in Class Number or Book Number. "
- 2 Letter or letters in () for " Contractions of words "
- 3 Letter or letters followed by other symbols in [] Facet with indication of Round, Level, Array and Octave, as the case may be.
- 4 Letter with a " bar " over it for the " Negative of the word represented by the letter without the bar. " Example $(\overline{W}) = \text{not } (W) = \text{not whole}$
- 5 Use has yet to be found for other kinds of brackets such as $\{ \}$ and " " .

64 LOGICAL APPARATUS

	Logical Apparatus	Stands for
S1	\equiv	is the same as
S2	\parallel	has the same meaning as
S3	$=$	has the same measure as
S4	\sqsubset	is defined as
S5	\sim	nearly
S6	$\sim \equiv$	is nearly the same as
S7	$\sim \parallel$	has nearly the same meaning as
S8	$\sim =$	has nearly the same measure as
S9	$\sim \sqsubset$	is defined nearly as
S10	N or \neg or $/$	is not
S11	$N \equiv$ or $\equiv \neg$	is not the same as
S12	$N \parallel$ or $\parallel \neg$	has not the same meaning as
S13	$N =$ or \neq	has not the same measure as
S14	$N \sqsubset$ or $\sqsubset \neg$	is not defined as

	Logical Apparatus	Stands for
S15	\forall (. . .)	is any all of (.)
S16	$\bar{N} \forall$ or \forall	is not all of or is some of
S17	\exists	is any of (.)
S18	$\bar{N} \exists$ or $\bar{\exists}$	is none of
S19	$<$	precedes
S20	$>$	succeeds
S21	\supset	is contained in
S22	$\bar{N} \supset$ or $\bar{\supset}$	is not contained in

65 Assumed Terms

One of the causes for failure in communication and for fallacy in thinking is failure to distinguish between Assumed Term and Defined Term. Failure in communication and fallacy in thinking are caused also by the unconscious introduction of new Assumed Terms in the course of thinking. This vitiates the Universe of Discourse. This has been discussed in Section 064 of *Dialectics of the Ude* (0) of S.R. Ranganathan in the *Annals* part of the *Abgila* 2, 1952, 210-211. Minimising these faults is one of the conscious efforts being made in the Library Research Circle. We are collecting the Assumed Terms occurring in the building up of classificatory language. Some time is spent in coming to an agreement about the true meaning of each "Assumed Term" to be "Assumed". This usually involves the process of one another's narrating experiences from life. Sometimes it involves pointing to a concrete object, assemblage of objects or symbols.

651 Illustrative List

- | | |
|-------------|--------------|
| 1 Attribute | 3 Finite |
| 2 Existent | 4 Idea Plane |

5	Infinite	9	School of thought
6	Measure	10	Separable
7	Notational Plane	11	Separate
8	One, Two, Three, etc.	12	Verbal Plane

652 Contraction

To secure brevity in the definitions in the next section the following contractions will be used :

Contraction	Term	Contraction	Term
(Am)	Amplifying	(FC)	Fundamental Category
	Amplified	(I)	Isolate
(Ar)	Array	(II)	Isolate of order 1
(Arl)	Array of order 1	(In)	Isolate of order n
(Arn)	Array of order n	(II)	Isolate Idea
(At)	Attribute	(IN)	Isolate Number
(BC)	Basic Class	(IP)	Idea Plane
(C)	Class	(IT)	Isolate Term
(CC)	Canonical Class	(MC)	Main Class
(Cd)	Compound	(NP)	Notational Plane
(Ch)	Characteristic	(Ph)	Phase
(CN)	Class Number	(Sq)	Sequence
(Cx)	Complex	(Sub)	Subject
(CS)	Classification Scheme	(U)	Universe
(F)	Facet	(VP)	Verbal Plane

A contraction may be taken to stand for singular or plural form according to context.

653 Defined Terms

Here are some illustrations of defined terms :—

- 1 Many \exists (2, 3 etc.)
- 2 (U) \forall (Many Existents)

3	(C) in (IP)		(Sub) in (VP) (CN) in (NP)
4	(MC)	DE	[(C) enumerated as (MC) in a (CS)]
5	(CC)	DE	[(C) enumerated as (CC) in a (CS)]
6	(BC)	DE	[(MC), (CC)]
7	(Ch)	D	[(At) incident in different measures at least on two existents in the (U)]
8	(11)	DE	[Division of a (U) based on 1 (Ch)]
9	(12)	DE	[Division of a (U) based in succession on 2 (Ch)]
10	(In)	DE	[Division of a (U) based in succession on n (Ch)]
11	(I)	DE	[(11) (12) (In)]
12	(Ar1)	DV	(II)
13	(Ar2)	DV	[(12) of 1 of (II)]
14	(Ar3)	DV	[(13) of 1 of (12) of 1 of (II)]
15	(An)	DV	[(In) of 1 of (In-1) of (In-2) . . . of 1 of (II)]
16	(Tr)	D	[(Sq) of (Ch) used to form a (Sq) of (Ar)]
17	(F)	DV	[(I) based on 1 (Tr)]
18	(Am) (I)		[(School of Thought)]
19	(Am) (F)	DV	[(Am) (I)]
20	(CdC)	DS	[(BC), 1 or many (I)]
21	(CxC)	D	[(Many (BC) or (CdC)]
22	(C)	DE	[((BC), (CdC), (CxC)]
23	(Ph)	DE	[(BC) or (CdC) of a (CxC)]
24	(FC)	ED	[(P), (M), (E), (S), (T)]

7 Brevity

The use of Symbolic Language brings in Brevity. This needs no proof. But the designing of Symbolic Tool Language is by no means easy. It has taken nearly 18 months to stabilise the Symbols listed in section 6 and its subdivisions. The sym-

bolic structure had to be frequently pulled down. This was traced to lack of circumspection and foresight in the earlier attempts. We have a limited choice of Symbols. We have to make them go the longest way. Of course, in a natural language, we make, say, 52 alphabetical symbols express every conceivable thought. But then, we do not put any limit on the number of letters in a word, or the number of words in a sentence, and so on. In other words, Brevity is not of the very essence of natural language—brevity of the kind sought in symbolic language.

71 AN ANALOGY

Imagine a sky-scaper to be built on a plot in a crowded city. Imagine the free adjacent space for stacking the building materials to be small. Confusion and inefficiency can be avoided only if the free space for stacking is carefully parcelled out and allotted to receive the diverse materials as and when they come. This allotment will have to take into consideration the quantity, the time-table of arrival, and use, the frequency of arrival, use and replenishment and all such myriads of factors.

72 PRUDENT ORGANISATION

So it is with the design of the Symbolic Tool Language needed for building a Classificatory Language—in fact of any artificial language. The species of oft-recurring ideas and their terms should be thought out. It is helpful to have as much of “literal mnemonics” as possible. The load to be carried by each letter is very great. Each letter has therefore to be propped up. Advantage is taken of this need. The props themselves are given significance. These props are made of bars, brackets, lateral inversion of letters and so on. The meaning of a letter gets fixed only along with the prop pressing, covering or supporting it.

73 SLOW PROGRESS

The progress in building the Symbolic Tool language is very slow. But the vigour, accuracy and rapidity of communication of thought—most of which is unfamiliar because it is new—experienced during the last two months in the Sunday meetings

of the Library Research Circle are refreshing and encouraging. The listlessness and the despair of the earlier days have shrunk a good deal. Cheerful certitude is establishing itself. This symposium got precipitated only as a result of this certitude and cheerfulness. It is our conviction that Library Classification will prove a failure as a tool in making communication of nascent micro thought expeditious and exact, unless it is erected on a firm foundation. It must be regarded as an artificial language designed for a defined specific purpose. As a preliminary to building it, another artificial Symbolic Tool Language should be built.

74 AN ANALOGY

In 1920's, it was decided to put up the Pykhara Hydro Electric Central Station in the Madras State. Pykhara is in a not easily accessible mountainous region. It was difficult to get the necessary materials and power to build that Central Station. To meet the situation, another water-fall of smaller volume and head was found in its neighbourhood. It was at Glen Morgan. For its smaller needs, the old-common, non-mechanised transport and muscular power were used. In a few months, the Glen Morgan Hydro Electric Station gave the necessary power to build the huge Pykhara Central Station.

75 CHAIN OF LANGUAGES

So it is with the building of the Artificial Classificatory Language, it has to supply enormous power to make communication of nascent micro thought expeditious and free from "noise" of any kind. To build this ultimate artificial language, we must build, as a preliminary measure, another smaller artificial language. This is the Symbolic Tool Language. In its turn, its own erection has to make use of whatever small power that, the natural language, its standard form and the jargon derived from it, can give. The Symbolic Tool Language has to be slowly but progressively improved. All along, therefore, we have to make use of a mixture of Natural Language and Symbolic Tool Language. This admixture of Natural Language in-

volves risk of fallacy. And yet this admixture cannot be avoided. We must, therefore, be extremely critical and aware. This vigilance will have to be continued till the proportion of the Natural Language in the mixture dwindles out. As the Symbolic Tool Language increases in its purity and power to avoid fallacies, it will become progressively unintelligible to be initiated. Even among the initiated, it will become unintelligible if they do not keep using it for the purpose for which it is erected—exactly as with a natural language other than mother tongues. In other words, building artificial Classificatory Language and the building of the associated Symbolic Tool Language form a specialist's job. This must be recognised. All work should proceed on this basis.

8 Symbolic Meta-Language

A symbolic language can no doubt mask all under-tones, over-tones and homonyms. It can also secure brevity. But this does not exhaust the potentiality of a Symbolic Language. As a symbolic language, Classificatory language itself has these two qualities. But it has also the quality of preserving and mechanising a preferred arrangement among subjects and recorded materials. Similarly Mathematics is a symbolic language with the additional quality of mechanising a part of thinking. Hilbert mentions Meta-Mathematics as dealing "with a system of symbols to be operated according to certain rules." It is only the symbols and the formal operations to which they are subjected with which Meta-Mathematics is concerned. It does not concern itself with the meaning of the symbols". We express certain initial ideas in symbols. Then we leave it to the care of Meta-Mathematics. The meaning of the end-product alone is taken up. This is indeed a considerable saving in the strain of thinking. We shall call a Symbolic Language which mechanises part of thinking by the name Symbolic Meta-Language.

81. SYMBOLIC LOGIC

As already stated Whitehead and Russell's, *Principia mathematica* (1910) is an elaborate example of a Symbolic Meta-

Language. It was designed as an artificial language to examine and rectify the foundations of another artificial language—Mathematics. Between the two World Wars, considerable progress was made in this Symbolic Meta-Language in Poland. Since World War II, many workers in this field have migrated to USA. During the last few years, quite a number of treatises have come on the subject, in English.

82 MY SEARCH

About 1949, serious work on the foundations of classification was begun in India. The series of articles entitled *Optional facets* appearing in the *Abgila* was used, as the medium for communication. Very soon I sensed the difficulty of pursuing the subject without the aid of a suitable Symbolic Meta-Language. I desired personal contact with the experts working on Symbolic Logic and General Semantics. The invitation in 1950, from the Rockefeller Foundation, came at the proper time. It gave me an opportunity to fulfil this desire.

83 THE FINDING

Pursuit of the subject in USA brought to light a difficulty not sensed till then. Work of the *Principia mathematica* kind was turned on a Symbolic Meta-language suited to deal with "Propositions". A "proposition" is a statement in the idea plane. It is a sentence in the verbal plane. Such a Symbolic Meta Language is quite suited to study a System of Sciences. For the Language of a System of Sciences has "Propositions". But a Classificatory Language is unlike the language of a System of Sciences. It has no proposition in the idea plane. It has no sentence in the verbal plane. Its term—Class Number—has only substantives and conjunctions. The Symbolic Meta Language needed to deal with Classificatory Language could not be derived from the Symbolic Meta Language developed to deal with the Language of a System of Science. At best, the latter can only provide a model for the way in which a Symbolic Meta-Language could be developed.

8 Work to be done

In the work done so far in the Library Research Circle at Delhi, the Symbolic Tool Language developed has acquired only the qualities of masking and of brevity. Hardly any power to mechanise thinking has been developed. This work yet remains to be done. Till it is done, progress in the general theory of classification or in laying sound and durable foundations for a classificatory language is bound to be slow and arduous. An insight into the happenings at the deeper levels of the foundation will be difficult. It needs several full-timed men of first rate ability to develop a symbolic language capable of serving at once both as a tool language and as a Meta language preparatory to the designing of a proper classificatory language. My appeal therefore goes to the universities and to the governments in the country to provide for research in the subject. My appeal goes also to Foundations of international coverage like the Rockefeller Foundation to take interest in the subject. Such Foundations have a freedom which statutorily organised tradition-bound universities or multi-interested bureaucracy-bound governments do not have. My appeal goes also to Unesco to lend its good services to make such free Foundations, which I know are keen to explore totally new terrains, to turn their helping hand to this work of the general theory and foundation of classificatory language. As shown in paper 2.1 of this symposium, the world has now reached a stage when research-work-in-team is absolutely essential to meet the unbalancing between population pressure and nature's gifts. This research work-in-team has to depend essentially on expeditious and exact communication of nascent thought among the members of the team. To secure this, an efficient classificatory language is essential. Thus work on the general theory and foundation of classificatory language is not merely an intellectual past time. It no doubt belongs to the so-called pure or fundamental disciplines or sciences. But its relation to practical life is not remote. It is immediate. It is compelling and fundamental.

SYMPOSIUM 2

REFERENCE SERVICE AND REFERENCE MATERIAL

PAPER 2.1

GENESIS AND PRESENT POSITION OF REFERENCE SERVICE AND REFERENCE MATERIAL

S.R. Ranganathan

[Traces the emergence of reference service, reference materials, and documentation work to the needs of Research in Team necessitated by the unbalancing of population-pressure and nature's gifts. Traces the history of the evolution of bibliography and documentation work. Describes the roles of the individual, a national corporate body, and an international body in the work. Gives a list of 41 bibliographies being currently sponsored by 32 non-governmental international bodies. Analyses the effects and defects of individual, national and international agencies for the work. Pictures the role of Unesco in the matter. Suggests the placing of its libraries Division directly under the Director-General instead of in any one of the Sections of Unesco.]

1 Shift in Function of Library

The primary social function of a library has, by now, shifted definitely. It was originally preservation for posterity of a recorded thought. This has now been made primary only in one library in each nation—the National Central Library—or a chain of such dormitory libraries. In every other class of library, this function has been demoted to a secondary position.

11 PUBLIC LIBRARY

The present-day primary social function of a public library is the helping of universal self-information self-enter-

tainment through mind and self-inspiration through contact with the intuitional deposit of enlightened souls. All these contribute to self-education.

12 SCHOOL AND COLLEGE LIBRARY

The primary function of a school or college library has an additional element. It is helping the learning, by doing under guidance, of the use of a library for self-education in the generalised sense described above.

113 Research Library

In a university or other academical library, catering to the needs of research, the primary function has become the expeditious and exhaustive communication of all recorded macro as well as micro thought, past as well as current.

114 Business Library

This new function of communication has become more pronounced and paramount in a business library. It is even more so in the library evolving in our own times as an integral part of the research auxiliary of a business organisation—national or private, and industrial or promotional.

12 CASUAL SOCIAL FORCE

This shift of emphasis in social function towards efficient communication, now culminating in business library, began inevitably after the industrial revolution. Industrial revolution substituted mechanical for muscular power. The potentiality of mechanical power was enormous. It demanded utilisation on a large scale. Large scale utilisation of power needed work on a large scale and all the hours of the day. This needed considerable research. Research depending on the native genius of the all-too-few, scattered, self-contained and mutually independent creative men, proved inadequate for the purpose. By now, this inadequacy has been intensified by the unbalancing of the equilibrium between population pressure and the mater-

ials of food, clothing and shelter available in a raw state in nature or slightly modified by individuals with but slightly cultivated native skill. The materials occurring in nature have to be supplemented on a large scale by fabricating from remote raw materials occurring in nature in plenty but without any visible suggestion even of their being capable of fabrication into ultimate commodities for consumption and service. Artificial rice from other grains not fit, in their native form, for direct consumption as staple food-material, portable nutritional tablets which played a vital part in World War II, clothes from petroleum, colour from coal tar, chemically impregnated timber and re-inforced concrete are a few examples of man-made commodity. Rapid aerial transport to equalise the erratic distribution in nature of consumable and near-consumable materials is another means of undoing the mischief of the unbalancing of equilibrium between demand and supply.

13 EFFECT ON RESEARCH ORGANISATION

These developments, consequent on life's inherent urge to maintain equilibrium between population-pressure and production and distribution of commodities and services, has brought about two changes in research work.

14 RESEARCH IN CHAIN

In the first place independent research by stray isolated geniuses without mutual check-up and correlation has given place to research even by lower order of men, in mutual consultation avoiding wastage of research man-power, caused by repetition and re-discovery of work, principles and techniques in several places. The former may be called "Research in Parallel." The latter may be called "Research in Chain".

15 RESEARCH IN TEAM

In the second place, it is now realised that to exploit fully a new seminal principle or technique created by a genius, needs a large hierarchy of workers, at all modulated removes from the

mental capacity and eminence of the genius. In the past, this exploitation and its distribution among the hierarchy was casual. It often took centuries to complete the exploitation. We have not yet fully exploited the seminal creations of Newton or of Volta. The casual social forces described in section 12 are now accelerating the process of exploitation. This demands the full hierarchy—down to the farthest remove in mental ability from the originating genius—to be set up here and now. Research work has to be done on team basis. The team has to comprehend members scattered all over the world. Expeditionary and exhaustive communication of nascent thought among the members of the team has become the very pivot of such Research in Team.

16 ELEMENTS IN COMMUNICATION

Two elements—Reference Service and Reference Material—emerge in making communication of nascent thought effective and adequate to the needs of Research in Team. Developing these elements requires, even for itself, specialised effort, research and organisation. The newly formed discipline "Library Science" should take charge of this specialisation. Every Research Team should include members of the Library Profession as an integral part. The work of this profession is as basic for Research Work in Team as machine tool industry is for industry in general.

17 REFERENCE SERVICE

The first element to compel the attention of library profession was the help to be given to each worker in a research team. Each has to be helped to exploit all recorded micro-thought relevant to his own work in the hierarchical organisation in the research team. The mode of service to each worker has to be adjusted to his mental aptitude and level. This has to be done in an intimate personal way for each member of a research team. The necessity for this individual help increases in intensity as we go down the hierarchy in the team. The genius at

the top will be a centre of self-illumination. Intimate reference service may be a convenience but not a necessity for him. This may hold good to some extent even in the case of the men of the second and third remove from the genius. The condition of the workers in the further removes is comparable to the ear of still-unborn grains struggling at the throat of the crop, as we say in Tamil, to emerge out into the status of full-born grains. Its emergence depends essentially on timely shower. In Sanskrit, it is called *Parjanya* (= one who helps birth or creation). Varuna is its presiding deity. So it is with the members in the further removes of the hierarchy of a research team. The timely shower in this case is timely Reference Service. The librarian is its presiding deity.

171 Genesis

The importance of reference service came to be sensed only after the development of research in team drawing into itself men of lower intellectual capacity. Reference service—not as a casual affair but as a conscious systematic affair—began to appear only in our own life-time. I remember seeing a thin streak of it just discernible here and there in some British libraries in my visit in 1924-25. That thin, pale, quickly disappearing incipient form of reference service recalled to mind the thin, pale, quickly disappearing streak of the waning moon in its second or third day after conjunction with the sun. The numerical predominance of public libraries, meant for entertainment and information of stabilised facts, appeared to my mind to be retarding vigorous development of reference service. However, I could see enough of it to be impressed by its enormous potentiality as a social force. This vivid impression made me set up reference service in my University Library at Madras almost immediately after return home. As shown in section 113, a University Library has considerable research function. This acted as a congenial soil for developing this new seedling of reference service. I was then fortunate in my Library Com-

mittee. It consisted mostly of old colleagues in the teaching profession. Two, who were not professors, were intimate friends. They were patriots. They welcomed new ideas. They had confidence in me. They got a vision, as it were, of the social potency of reference service. It was therefore possible for me to increase the staff of four to six. The two new recruits were the only graduates in the staff of the University Library, excluding myself. They were recruited for the sole purpose of doing reference service. Their number was eventually increased to five. These young graduates were quite appreciative of the mission on which they were put. They co-operated with me whole-heartedly. We formed a well-knit team of six. These five members of this team had no red tape to unwind. Indeed they had no desk to sit at. They were mostly on floor duty—receiving readers, helping them to enunciate their requirements, hunting with them for materials to meet their requirements, enjoying all the thrill of such a hunt, retrospectively comparing notes of the methodology emerging from the actual hunt, generalising the finding into principles of reference service and so on. Shri C. Sundaram and Shri K.M. Sivaraman lived this life longest—the former in actual service to readers and the latter in doing the necessary work behind the screen to make that service effective.

172 Record of Findings

In about fifteen years we gained considerable experience in the highways and by-ways of reference service. The Five Laws of Library Science were always lighting up our path. The hearty response of the students, teachers and the public always acted as a stimulus. *Reference service and bibliography* by Ranganathan and Sundaram published in 1940 as V 9 of the publication series of the Madras Library Association gives an elaborate description of the theory and practice of reference service. It contains many short anecdotes and some fuller illustrative actualities.

173 Record of Materials

In a similar way the reference materials pressed into service during the fifteen years went on increasing in number. Shri Sivaraman was of immense help in keeping track of these. Our own library and the other libraries in India were poor in reference materials. There was therefore a wish to send Shri Sivaraman out to important libraries in other countries of the world to prepare an authentic bibliography of reference materials by actual physical verification. But World War II came in the way. The urge to round off this experience by proper recording was however pressing. The result was *Bibliography of reference books and bibliographies* by Ranganathan and Sivaraman published in 1941 as volume 10 of the publication series of the Madras Library Association. Similar lists had already been prepared in England and America by Minto and Mudge respectively. More recently Theodore Besterman has brought out his *World bibliography*.

18 ORGANISATION OF RECORDED MICRO THOUGHT

The second element necessary to make communication of nascent micro thought efficient is the prior organisation of all such recorded micro thought. The very process of accelerated exploitation of seminal thought by a vast team causes a continuous down-pour of micro thought. These get embodied in tiny articles, reports and pamphlets. Their number is myriad. The number produced each year is itself myriad. This phenomenon is described in detail in Ranganathan's *Classification and communication* (University of Delhi, library science series, 3), 1951, part 2. This cascade of embodied new micro thought has to be collected together from all the spots where they happen to fall. Their collection in their entirety is prohibitively arduous. It is beyond the financial capacity of any single library. The feasible work is to list their titles with annotation and abstract wherever necessary. This listing is Bibliography-Building and Documentation-Work. The former term was used first,

in the days of listing only whole books or pamphlets or periodicals. But the inclusion of the author and the subject analyticals particularly for periodicals, has now become imperative. A new term had to be improvised to denote building of bibliography rich in analyticals featuring micro thought. The term "Documentation-Work" has been improvised to denote bibliography-building of this kind.

2 Ordinary Reference Material

Ordinary reference material, other than bibliography, was the first to evolve. These consist of:

- | | |
|---------------------------|-----------------|
| 1 Biographical dictionary | 7 Formulae ; |
| and who's who ; | |
| 2 Concordance ; | 8 Gazetteer ; |
| 3 Digest ; | 9 Guide ; |
| 4 Linguistic dictionary | 10 Statistics ; |
| (General) ; | |
| 5 Linguistic dictionary | 11 Table ; |
| (Technical) ; | |
| 6 Encyclopaedia ; | 12 Year Book |

The Year Book or Directory made its appearance about the middle of the eighteenth century, i.e., after the expiry of three centuries after the invention of printing. Encyclopaedia too took shape about the same time. Today there are nearly 6,000 Reference Books. Many of them are of the closed variety. Some of them are also of the open variety.

21 INDIA

Many of the fields of Indian thought are still without reference materials. One of the earliest efforts to be made jointly by the publishing trade, the learned bodies, and the library profession is the covering of the entire field of India's thought with appropriate reference materials. In the eighteenth century, when the West created such reference materials, money was found in plenty in private hands. The function of the State

was confined to the primary one of maintaining law and order within the country and protecting it from aggression from outside. Today both these conditions have changed. The distribution of wealth is tending to leave very little surplus money in private hands to finance such tools for intellectual service. The State has progressively increased its sphere of functions—down to the point of supplying commodities and services. Intellectual service and commodities have the least pressing demand. And yet the future of the country depends upon their supply, wide distribution and universal consumption. It is therefore necessary that the governments should co-operate with the learned bodies and the library profession to promote the production of such reference materials. In this respect the attempt of the Government of Madras to produce an encyclopaedia in Tamil is commendable. So is the successful completion of the *Tamil Lexicon* by the University of Madras. It is, however, unfortunate that the new edition of the *Catalogus catalogorum* entrusted to the University of Madras is not being developed vigorously or completed expeditiously. These few attempts are but infinitesimal in the light of what remains to be done in regard to reference materials in India. The new generation both at College and outside is sensitive to the needs of such materials. Will we have to wait till this generation comes to power to get such material produced? Or, is there a chance for even the people now in power having the necessary farsight to produce them here and now?

3. Evolution of Bibliographical Material

Bibliographical materials form a special class of reference materials. Their increasing importance in communication has been explained in section 18. Bibliography-building of macro-thought, embodied in whole books, began within a century of the invention of printing. The rate at which books were brought out by the new art of printing made it necessary to build bibliographies of them. The chief landmarks in their development

go with the following names:—

- 1 TRITHEIM (Johann), *Libre de scriptoribus ecclesiasticis*. 1494. Basle.
- 2 GESNER (Konrad). *Bibliotheca universalis*. 1545. Zurich.
- 3 CORNELIUS A BEUGHEM. *Incunabula typographiae*. 168—. Paris.
- 4 GEORGE (T) *Allgemeines europaisches Bucherlexicon* (1501-1739). 1742-53.

By this time universal bibliography proved too unwieldy to be produced as an independent venture. The wisdom of replacing it by a series of national bibliographies, published annually, was realised. But this equivalent of a universal bibliography is still in the state of wish. Unesco is endeavouring to hasten its realisation by suggestion and persuasion extended to its member nations. India's *Quarterly lists* published by the Registrars of Books of the constituent States is a primitive form of national bibliography. In the Madras Library Act, I had included a section to bring it into modern shape. The rules suggested under the Act reinforced it. Shri K.D. Puranik and S.P. Phadnis have drawn a detailed picture of such State and National Bibliographies in *Public library provision and documentation problems* (Indian Library Association, English series, 3), 1951. In my recent *Library legislation: A handbook to the Madras Library Act* details for the handing over of the State Bibliography to the State Librarian have been worked out. Germany, France and Denmark are producing good National Bibliographies of the "Open Variety". Perhaps the latest and the best featured is the *British national bibliography* (1950—) done with a progressive outlook and thoroughness by A.J. Wells and his band of devoted collaborators.

4 Genesis of Documentation

41 NATIONAL ATTEMPT

Documentation first began for individual sciences. These were provided with documentation lists of the open variety—

abstracting or indexing periodicals—by individual countries Chemistry appears to have been the first subject to be so provided. Germany was the country to provide it. This started as *Pharmaceutisches Centralblatt* in 1830. It is still continued as *Chemisches zentralblatt*. England stepped into the same subject in 1847 with its *Quarterly journal of the Chemical Society*, which had an Abstracts Part. This is still being continued as *British abstracts*. These early attempts led to a number of countries entering the field. Several subjects are now being covered. There is overlapping. There are gaps. There is little co-ordination. There is seldom complete coverage. This still continues. Germany soon became famous for its abstracting periodicals. The British Empire extended its range of subjects. After World War II, the more affluent United States is attending to several subjects. Some new countries too have entered the field. But India's recovery from her cultural exhaustion has been too recent for her to enter this field. The absence of co-ordination is increasing. The great increase in the cost of physical production is pressing its attention on all concerned.

42 INTERNATIONAL ATTEMPT

Even before the library profession became sensitive to the need for documentation work, leaders of scientific research had found it necessary. Their private feelings got integrated and vocalised by a proposal made by Prof. Joseph Henry at the meeting of the British Association for the Advancement of Science held in 1855. The Royal Society implemented this by its *Catalogue of scientific papers*, 1800-1900, 19 V, 1867-1925. It is a monument of co-operative effort. It is an author index, for the whole of the nineteenth century, to 1,555 learned periodicals.

43 INTERNATIONAL CATALOGUE

Research workers soon found the need for continuing this documentation work into contemporary years. Henri

La Fontaine and Paul Otlet started work in 1892. The first International Conference on Bibliography was accordingly held at Brussels in 1895. At this conference, the International Institute of Bibliography at Brussels was recognised. The first National Section was formed in France in 1896. The Brussels Institute was to continue the work into the literature of the twentieth century in a separate series for each of the major divisions of the Sciences. These formed the *International catalogue of scientific literature*, 1901-1914 or so in 17 series:—

B	Mathematics (Series A)	I	Botany (Series M)
B7	Mechanics (Series B)	K	Zoology (Series N)
B9	Astronomy (Series E)	L: 2	Anatomy (Series O)
C	Physics (Series C)	L: 3	Physiology (Series Q)
E	Chemistry (Series D)	L: 42	Bacteriology (Series R)
G	Biology (Series L)	U	Geography (Series J)
H	Geology (Series H)	U28	Meteorology (Series F)
H1	Mineralogy (Series G)	Y	Physical anthropology
H6	Palaeontology (Series K)		(Series P)

The international organisation in charge of this work virtually got paralysed by World War I. Over-centralisation was then sought to be avoided.

44 DECENTRALISATION BY COUNTRIES

Decentralisation was proceeded with. In 1922 the Dutch Institute of Documentation was formed in association with the Dutch Patent Office. Mr. Donker Duyvis still continues to be its moving spirit. The British Society for International Bibliography was founded in 1927 as the British Section of the International Institute. The Swiss Committee for Documentation appeared in 1929. In 1932 Germany established its centre at the Library of the Berlin Technische Hochschule. By 1939 there were 12 National Sections. The other countries were Italy, Denmark, Russia, Poland, Czechoslovakia and United States. After World War II, decentralisation is being extended.

In the meantime, at the World Congress of Universal Documentation held at Paris in 1937, the FID (International Federation for Documentation) with its headquarters at the Hague was created as the successor to the Brussels Institute.

The Decentralisation by countries has not proved quite a success. Finance as well as man-power are the bottle-necks strangling them from co-operative growth to make a world-coverage.

5 Decentralisation by Subjects

Decentralisation by subjects is the next alternative to be tried. The outline of a scheme for this has been given in *Classification and international documentation* of Ranganathan published in the *Review of Documentation* of the Fid, 14, 1947, 154-177. In the meantime Unesco is encouraging non-governmental, non-profit-making international bodies devoted to particular subjects to take up international documentation in their respective fields. It also promotes the formation of Unions or Councils of international bodies in allied subjects to make the documentation work more economical.

51 INTERNATIONAL BODIES

The *Year book of international organisations*, 4, (1951-52), 1951, published by the Union of International Relations at Brussels, mentions 951 international bodies. 385 of these were formed after 1945 when World War II ended. 60 are inter-governmental bodies. The list includes 821 non-governmental bodies. 212 of these bodies have direct relation with UN and its specialised agencies like Unesco. Thirtytwo of the international non-governmental bodies have taken up the work of bibliography. They produce 41 bibliographies. A few of them are of the closed variety. But many are of the open variety.

52 LIST OF INTERNATIONAL DOCUMENTING BODIES

Here is a list of attempts at documentation work under the auspices of international bodies. The list is arranged

according to subjects. Under each subject the name of the bibliography and of the sponsoring body with its year of foundation and address are given:

a Generalia

Inter-American bibliographical review, 1941-44 (Inter-American Bibliographical and Library Association (1930), University of Florida Library, Gainesville, Florida, U.S.A.)

A Science

Survey of scientific and abstracting services, 1949 (International Federation for Documentation (1892), 6 Willem Witsenplein, the Hague, Holland).

Bibliographies, Directory of periodicals containing bibliographies and abstracts, V 1, Science and Technology, 1951 (International Federation for Documentation (1892), Willem Witsenplein, Hague, Holland).

B9:8 Tide

Tidal bibliography, 3,1932; 4,1936;5,1939. (International Association of Physical Oceanography, (1919), c/o Geofysic Institut, Bergen, Norway).

B91:621 Geodesy

International geodetic bibliography (1 V 3 years) (International Association of Geodesy 19 Rue Auber Paris 9, Successor to International Geodetic Association, Potsdam, functioning before World War I).

H4132 Seismology

International seismological summary, 1918, published in Kew (International Association of Seismology 1901), C/o Prof. J.P. Rothe, 38 Boulevard d'Anvers Strassburg, France).

F Technology

Scientific digest (International Superphosphate Manufacturers' Association (1926), 32 Old Queen Street, London S.W.1).

G11 Cytology

Annual review of cytology (International Society for Cell Biology (1947), c/o King's College, London W.C.2, Successor of International Society of Experimental Cytology).

G955 Limnology

Bibliography, 25 Janre 1948 (International Association of Theoretical and Applied Limnology (1922), c/o Institute of Limnology, Uppsala, Sweden, a section of International Union of Biological Science).

H1:8 Crystallography

Structure reports (Review of current crystal structure determinations) (International Union of Crystallography (1948), c/o Cavendish Laboratory, Cambridge).

H7 Economic Geology

Bibliography of hydrology (International Association of Scientific Hydrology (1922), 61 Rue de Ronces, Genthrugge, Belgium, a constituent of International Union of Geodesy and Geophysics).

I Botany

Index Herbariorum 1948 (International Union of Biological Sciences (1919), 57 Rue Cuvier, Paris 5).

JA Forestry

Forest bibliography (1934) (International Union of Forest Research Organisations (1890), 11 Tannenstrasse, Zurich 6, Switzerland).

K96:52 Bird Protection

Synopsis of principal legislative measures concerning the protection of birds in Europe (1932) (International Office for the Protection of Nature (1928), 31 Rue Vautier, Brussels).

L73 Nervous System

Bibliography of electro-encephelography as supplement to Journal of electro-encephelography and clinical neurophysiology (International Federation of Electro-encephelography and Clinical Neuro-Physiology (1949), 149 Promenade de la Corniche, Marseille, France).

LM Naturopathy

Archives of medical hydrology (includes a brief summary of work on the subject, published in each country) (International Society of Medical Hydrology (1922), c/o Hydrology Institute, University of Careggi, Florence, Italy).

M4 Smithy

Bibliographical bulletin for welding and allied processes (Q) (International Institute of Welding (1948), 2 Buckingham Palace Gardens, London S.W.1).

MY26 Mountaineering

Bibliographic and information bulletins (International Union of Alpine Associations (1932), 16 Boulevard des Tranchees, Geneva).

O Literature

Reportoire chronologique des litteratures modernes (International Committee of Historical Sciences (1926), Staatsarchiv, Zurich, Switzerland).

Repertoire chronologique des literatures modernes (1937) (International Federation of modern languages and literature

(1928), c/o International Council of Philosophy and Humanistic Studies, Unesco House, 19 Avenue Kleber, Paris 16).

International PEN bulletin of selected books (International PEN Club (1921), Glebe House, 62-3, Glebe Place, Chelsea, London SW3).

P Linguistics

Linguistic bibliography for 1939-47. 2 V for 1948. (Permanent International Committee of Linguists (1928), 40 Sint Annastraat, Nijmegen, Netherlands).

Tentative bibliography (Permanent International Committee of Linguists (1928), 40 Sint Annastraat, Nijmegen, Netherlands).

P, 31 Name Science

Onoma, bibliographical and information bulletin (International Committee of Onomastic Sciences, (1949), c/o Institut voor Naamkunde, 10 Evan Erenstraat Louvain, Belgium).

R Philosophy

Bibliographie de la philosophie. (Internationale Institute of Philosophy (1937), Sorbonne, Facule des Lettras, Paris 5).

U Geography

Bibliographie géographique internationale 1945-6. 1949 (International Geographical Union (1922), c/o American Geographical Society, Broadway at 156 Street, New York 32).

UI Cartography

Bibliographie cartographique internationale 1946-47. 1949. (International Geographical Union (1922), c/o American Geographical Society, Broadway at 156 Street, New York 32).

U28 Meteorology

Bibliography on actionometry (International Association of Meteorology (1919), 3 Avenue Circular, Uccle 3, Brussels. Belgium (1919).

U8 Travel

Bibliographie des grands voyages et des grandes découvertes. (International Committee of Historical Sciences (1926), Staatsarchiv, Zurich, Switzerland).

V History

Bibliographie internationale des sciences historiques (1926-39 and 1949) (International Committee of Historical Sciences (1926), Staatsarchiv, Zurich, Switzerland).

World list of historical periodicals and bibliographies (International Committee of Historical Sciences (1926), Staatsarchiv Zurich, Switzerland).

Bibliography of colonial history (1900-1930) (International Committee on Historical Sciences (1926), Staatsarchiv, Zurich, Switzerland).

V1:76 Chronology

Bibliographie pour la Chronologie des fiefs de la France et de l'Orient latin (International Committee of Historical Sciences (1926), Staatsarchiv, Zurich, Switzerland).

V5:13 European Federation

Bibliography of federalist books (Inter-University Union of Federalists (1949), 11 Rue Louis le grand, Paris 2).

Bibliographies of articles and documents (Inter-University Union of Federalists (1949), 11 Rue Louis le Grand, Paris 2).

V6 Africa

African abstracts (International African Institute (1926), 17 Waterloo Place London S.W. 1).

W Political Science

International Political Science abstracts (International Political Science Association and International Studies Conference), Unesco 1951.

W:8 Administration

Bibliographical monographs (International Institute of Administrative Sciences (1930), 17 Place des Martyrs, Brussels, Belgium).

X:31 National Income

International bibliography on income and wealth 1 (1937-47); 2 (1948-9) (International Association for Research in Income and Wealth (1947), 2 Dean French Street, Smith Square, Westminster, London S.W. 1).

Y Sociology

Current sociology. International bibliography of sociology. 1952 (International Sociological Association (1949), 4 Grey Wedels pl, Oslo, Norway).

Z Law

Catalogue of sources on documentation (International Committee of Comparative Law (1950), Sub-Committee on Documentation, Unesco, 19 Avenue Kleber, Paris 16).

6 Observations

In 1942 Ranganathan and Sivaraman's *Bibliography of reference books and bibliographies* was published. From 3 to 5 April of the same year, the Fifth All-India Library Conference was held in Bombay. These two events led to a study of the then state of reference books and bibliographies. This study appeared as a symposium of seven papers offered by the members of the staff of the Madras University Library. These papers were printed in the *Proceedings* of the conference, Pp 86-140. They disclosed the fallow fields and the over-worked ones. It was found that only 44 out of 161 bibliographical periodicals belonged to Humanities and Social Sciences. The remaining three fourths of the total output belonged to Physical and Biological Sciences and their applications. This discrepancy has not yet been removed.

61 NATIONAL EFFORT

These early bibliographies were sponsored mostly by learned bodies in different countries of Europe and America. India had only one to its credit. Even this had eventually proved abortive.

62 INTERNATIONAL EFFORT

The 42 bibliographies listed in section 52 are mostly later ones. 18 of these belong to the Physical and Biological Sciences and their applications. 24 belong to Humanities and Social Sciences. This rise in the proportion of Humanities and Social Sciences is due to some planning behind the whole affair. The planning is being brought about by Unesco. It is desirable.

7 Reflections

71 WORK BY INDIVIDUAL

The thoroughness, reliability and promptness of a bibliography and its continuation in the case of bibliographical periodicals have to depend ultimately on the competence, application and devotion of individuals. This concerns the intellectual part of the work. Work by an individual is capable of investing it with the wholeness and the efficiency of a work of art or of creative work. It is born of inner urge. It is spontaneous. It is not done under duress. It is done for its own sake. It is not done for any other consideration—least of all for considerations of money, power or fame. It is not done as a task. This is true even in the making of material commodities such as a motor car or the coronation cake. This is even more pronounced in intellectual work such as bibliography-building and documentation work.

711 Cost Kills

But the cost of physical production has always been beyond the means of individuals. It has now gone beyond the means

even of a single learned body (the consumer body) or of a single library (the distributing body). Therefore individual devotion is necessary but not sufficient. Cost kills the best. We are obliged to accept second or some lower best.

72 CORPORATE BODIES

In the past, a single learned body or a single commercial agency had successfully maintained a bibliographical periodical. Some of the widely used and long-standing bibliographies are due to such an agency. But in recent years even this is threatened by the increased cost of production. This is being provisionally met by a number of learned bodies in a country federating together to finance and maintain bibliographical periodicals. This is happening widely in the United States of America. When it had the affluence of an empire, Great Britain met the situation by setting up *ad hoc* quasi-governmental "Imperial Boards or Councils" for centralising the organisation. The centralising technique of Russia is leading to yet another type of organisation—the affiliating type with a national body at the centre and affiliated bodies formed on subject and geographical basis.

73 INTERNATIONAL BODIES

Another factor has emerged at present. In the past, most of the nascent thought was created in a few countries of the West. They were in a few languages. Since the end of World War I, creative work has been increasing in quantity and quality in many other countries of the West. Since the end of World War II, Asian and African countries have begun to recover from their cultural exhaustion which began even before the West began to develop. This renaissance in the East has already begun to swell the quantity of nascent micro thought being created in the world. Apart from increase in quantity, many more languages are becoming the media for communication. When this was in a twilight state, so to speak, the production of the East was not finding adequate representation in the

bibliographies produced in the individual countries of the West. Of late, there is an attempt to set right this situation. The attempt is due partly to the assertiveness—meek though it be still—of the Eastern countries. It is also partly due to the awareness of some of the alert sponsors of bibliographies produced in the West. They are beginning to act on the principle that the money earned by selling dogs will not bark and that it is as good money as anything else. In spite of this, the habit of the last four centuries is unconsciously making many in the West to mean by “world”, the “West” only, in discussions about sciences and bibliographies, in international meetings and endeavours. It is in this situation that Unesco is acting as a corrective. The need to spread the financial and organisational burden over several countries on the one hand and the desire for weaving the nascent thought of the East fully into the bibliographies of the world on the other hand, are together prompting Unesco to encourage and to bring about international auspices for establishing bibliographical service in new fields of knowledge. In this process it is also attempting to set right the discrepancy in quantity between bibliographies in the Physical and Biological Sciences on the one hand and the Humanities and the Social Sciences on the other. The International Bibliographical Committee set up by Unesco has just begun to do spade work in this matter. The amount of work to be done is enormous. It is also of a delicate nature. The century-old exclusiveness of the West and the new-born assertiveness of the East have to be reconciled tactfully by oblique methods.

74 A POSSIBLE DANGER

An international body is further removed from individuals of the scholarly and devoted kind than a national body. It gets cluttered with administrators, committee-men and often also old men, most of whom do not do primary bibliographical work or even primary reference service. This factor leads

to vexing spuriousness in international deliberations. Ploughing deep becomes difficult. A good deal of money is spent in air-travel and conference expenses. Little money is left for work down at the earth. Little attempt is made to have a scientific appraisal of the production. The scholarly devoted individual is shy, withdrawing and sometimes offensively cynical. The successful committee-man is aggressive, assertive and sometimes even so ruthless as to cling to the shell of empty form quite insensitive to life not entering into it. This contrast is more rampant at international level than at national level. At the national level, a century of drift through trial and error is at last yielding to a bridging of the gulf between these two types of individuals who have both a right role to play in the matter. But this problem is only a few years old at the international level. The cement of the consciousness of belonging to a homogeneous group—the nation—is lacking. The true evaluation of the participating individuals is rendered difficult by the absence of the intimacy possible within the smaller compass of a nation. Bumptious individuals have a greater chance in the international plane to impose themselves by social charm and demagoguish tricks. Therefore there is considerable difficulty and delay in finding a proper method of reconciling these early tendencies of an international sponsoring body with the proper utilisation of hard-working, trustworthy and competent individuals motivated by inner academic and aesthetic urge. The gulf to be bridged at present is too vast.

75 HOPE

But my optimism is unbounded. I believe in the increasing capacity of humanity to face any difficulty. I do hope that Unesco will eventually find out the technique for harnessing genuine individuals with ability and loyalty and at the same time make it possible for them to work with honour and zeal under the auspices of international bodies. Some nations have already succeeded in this. Some learned corporate

bodies successfully take charge of organisation without failing to find out the right man to the right job and allowing him to do it in the right way. Nations have taken more than a century to reach this level of reconciliation between individuals and national bodies. With the good will, influence and drive of gifted personalities at the head of affairs, it may be possible to reach a similar reconciliation between individuals and international bodies in a shorter time. This is the vital work to be done by Unesco to make Research Work in Team on world basis proceed on efficient and helpful lines, needed for meeting the present unbalancing of population-pressure and nature's gifts, taking world as a whole.

8 Lay Out of the Symposium

This symposium is the second symposium presented to the Tenth All-India Library Conference being convened at Hyderabad. It is on Reference Service and Reference Materials. It is made of papers contributed by two different classes of authors. The first class may be described as those who are inside the counter—within the library profession. The second class may be similarly described as those who are outside the counter—the research workers. The former are the distributors of micro-thought. The latter are its consumers.

81 PAPERS FROM THE LIBRARY PROFESSION

Papers 2·2 to 2·16 are by librarians. They cover diverse kinds of libraries and regions of knowledge. Some of them begin with some illustrative actualities in reference service. They then mention the oft-used reference materials. Finally they also give some reflections based on experience.

82 PAPERS FROM THE RESEARCH WORKERS

Invitations were sent to research workers in different

fields of knowledge to present their view of the subject. A few have happily responded. Their contributions appear as 2·17 to 2·20. They too follow more or less the same pattern as the first set of papers.

83 APPEAL TO OTHER COUNTRIES

I feel that the time has come to have this kind of check up and hearty exchange of experience between the library profession and the research workers. The low level of activity still persisting in India has no doubt led to feebleness of result in this attempt. This is due to the fact that six years after independence have proved to be too short a period for the intensity of research work and of reference service to reach sufficiently high dimensions. All the same we appear to have begun to move. Similar attempts in the more developed countries of the West are bound to give more reliable indications. I took part in an attempt of this kind made with great success at the Fifteenth Annual Conference under the auspices of the Graduate Library School of Chicago in July 1950. Prior to that, two conferences of the Royal Society made a first attempt. This check up should be done more widely in as many countries as possible. Then only we shall be able to get a proper grasp of the bibliographical problems in need of being solved.

84 UNESCO

Unesco can do much to promote this preparatory work. Its jurisdiction extends over the entire universe of knowledge. Education, Science and Culture do cover collectively the entire universe of knowledge. The Libraries Division is keen about the promotion of reliable and prompt bibliographical world coverage. The location of the Libraries Division in one of the Sections of Unesco is likely to lead to lack of co-ordination. While serving on the International Committee of Library Experts of the United Nations from 2 to 9 August 1948, I sensed a similar danger in the location of the Library Department under one of the major sections of the organisation

of United Nations. I therefore pleaded for the Library Department being placed directly under the Secretary-General. This suggestion was given weight by the International Committee as the following extract from its report, United Nations: *Library services*, shows:

"Location of the Library in the United Nations structure.

"The position of the Library within the administrative structure of the Secretariat was considered by the Committee in the light of its present location in the Department of Public Information, and of the reference to this matter in the "First Report of 1948 to the General Assembly of the Advisory Committee on Administrative and Budgetary Questions" (A/534, page 4, paragraph 19).

"The Committee recommends that the function of the Library be recognized as that of an organisation-wide service of a non-administrative character, and that it be given the status and independence appropriate to this function.

"It might be held that in these circumstances the Library has no logical association with any of the existing departments of the Secretariat, and that it might most appropriately be attached to the Executive office of the Secretary-General. However,....."

Then came the pressure of other interests, not the least of which was 'prestige' preventing the withdrawal of a step once taken by a bureaucracy. I should very much like that the Libraries Division of Unesco should be kept outside the three sections, Education, Science and Culture. It should be attached to the Director-General even as perhaps the Finance section is. Even in a National Commission for Co-operation with Unesco, library matter gets nearly crowded out in deliberation as well as in action. It proves to be its Cinderella. This is particularly so in newly developing countries—the very countries where special effort is necessary in the development library service. Unesco should set an example by giving the proper place to the Library Section in consonance with its coverage of the entire field of knowledge.

PAPER 2·2

**PUBLISHERS' CATALOGUE
AND REFERENCE SERVICE****K.M. Sivaraman**

[Describes and illustrates the diversity in the standards of publishers' catalogues and their reference value. Points out the examples of Columbia University Press and Oxford University Press in making their catalogue of as much reference value as library catalogues. Makes an appeal to the Indian Publishers' Association to make a co-ordinated effort to improve the publishers' catalogues].

1 Introduction

It is not always that a reader seeking some definite information can be satisfied by referring to a common reference book such as Encyclopaedia or a Dictionary. Occasions arise when a reader requests the reference librarian to help him with some printed book or pamphlet on any particular topic in which he is interested. It is possible that the library has no material required by that reader. In such a situation only two steps are possible. The line of least resistance and ennui may prompt the reference librarian to send away the reader with the words, 'Sorry, we have nothing to help you'. A more energetic reference librarian, who is imbued with the spirit of social service and faith in the ability of books to help humanity, will be urged by the Second and the Third Laws of Library Science to set to work immediately. He will ask the reader to wait for a few minutes and himself search the catalogues of booksellers and publishers to find out whether anything has been published on the topic required by the reader. If he succeeds in the attempt, he informs the reader of this fact and asks him to call at the library after a few days. When he tells the reader thus, he believes that it should be possible for him to get the books from some other library. His belief is based on one of the modern trends in library service which

treats the book resources of a whole country, even of the whole world, as a single unit in which the system of inter-library loan places all readers at the same level, no matter in which part of the globe he lives.

2 Diverse Practices

All this is easily said. But the *modus operandi* is beset with many difficulties. The chief of these is with the publisher's catalogues themselves. They are many in number. Each has its own method of arrangement. For instance, in some, books are arranged alphabetically by titles. In some others, the arrangement is alphabetical by names of authors. A few others scatter the titles under a few class headings, and give no alphabetical index. Yet again, there are cases in which books are arranged under a few class headings familiar perhaps to their compilers only.

21 BIBLIOGRAPHICAL DETAIL

It is also not unusual to meet with inconsistency in the matter of the bibliographical details they contain. There appears to be no standard about this. If we examine the publisher's catalogues produced about a decade or two ago, we will find that some of them contain re-production of title pages, specimen pages, portraits of the authors or some unique pictures from their new publications. Some of these illustrations assume a reference value.

22 UNEXPECTED DATA

Trade catalogues and price lists sometimes contain short bibliographies on the subject, allied to their trades and also specifications of formulae, illustrations etc., which are unobtainable elsewhere. A local medical library has a small collection of the catalogues of important pharmacutists. On a certain occasion a reader wanted to have a picture of Clodd Bernard, an endocrinologist. Search through books, periodicals and

reference books yielded no result. When he was at his wit's end, it suddenly occurred to the librarian that some of the trade catalogues might contain the picture. A vigorous search for five minutes among these fugitive materials proved fruitful. The information was found in one of the *Ciba monographs*. It turned out to be the only source material from which a reference question could be answered. In telling this, I do not want to assign any high reference value to these catalogues. In fact the values of such catalogue in any library is seldom felt beyond the stage of book selection. What I want to impress by the above is to point out the lack of standards in the matter of inclusion of details in the publishers' catalogues and other 'Trade catalogues'.

23 WITH REFERENCE VALUE

There are a few showing evidence of much thought and attention. These arrange the titles of books on some conventional scheme of classification of their own and provide helpful alphabetical indexes. Further they are kept up-to-date by periodical supplements. In other words they are of the 'open variety'. These have a greater reference value. A few typical ones having some reference value have been described in the first volume of *Reference service and bibliography*, (Madras Library Association, publication series, 9) 1940, by S.R. Ranganathan and C. Sundaram.

24 BOOK SELECTION VALUE ONLY

An examination of a large number of publishers' catalogues would show that publishers are anxious to reach consumers, i.e. potential buyers, as quickly as possible. For this purpose, they send out lists periodically even while their books are in the Press. Such catalogues contain the list of not only the forthcoming publications but also of those published just at that time. The titles are arranged in some classified order and most the them are annotated. But reference to particular

title becomes difficult on account of the absence of a systematic classification and/or an alphabetical index. But the seasonal lists like the 'Spring List', 'Autumn List' etc., of the Oxford University Press and the fall and spring lists of some of the American Universities are an exception to this. Even in these cases it should be said that the bibliographical information is not always accurate. Hence catalogues of this type lose their reference value and at best they can be used only for book-selection.

25 REPRODUCTION OF CONTENTS PAGE

Again it is found that, in some early catalogues, the contents of some of the books are given with a view perhaps to enabling readers to evaluate the book. No doubt this practice has a limited value. In these days, however, any one can examine any book of an important publisher in the shop of his bookseller. Failing this, he can call for details about a book from the publisher himself. The reply will reach him in a day or two. Therefore, I think the practice of giving the contents page of each book may, with advantage to the publisher, be dropped. Of course this should be retained in the case of the few books, that have oblique titles. The sixth edition (1928) of the *General catalogue* of the Oxford University Press contains the following entry on page 212.

"William Morris, b. near London 1834, d. 1896
Morris's prose and poetry, 1856-1870, comprising eight Prose Romances from the Oxford and Cambridge Magazine 1856; The Defence of Guenvere 1858; The Life and Death of Jason 1867, reprinted here from the second edition, revised of 1868, with the variant readings of the first edition at the foot of the page; Miscellaneous Poems, 1856-70, including two sonnets, here for the first time reprinted and attributed to Morris; three descriptive and critical Articles from the Oxford and Cambridge Review 1856, and one on Rossetti's Poems, from

the Academy 1870. With a half-tone portrait from a photograph by Emery Walker, and index of first lines. Pp. Viii, 656. From 3s. 6d. net. See p. 188. But in the edn 8 (1946) this entry has been abridged as follows:—

William Morris (1834-1896) Prose and Poetry 1856-1870. Pp. 664. (For Bibliography see p. 174) (Oxford editions of standard authors)

26 ANNOTATION

Lastly I have to tell somethinga bout annotation. This is given at the end of each title as in the *Columbia books* 1893-1933, in the *Educational catalogue* and the *Catalogue of books for the overseas schools* of the Oxford University Press, Indian Branch, and in the *Select catalogues* of the Oxford University Press. But most of the catalogues of the American University Press and the *General catalogue* of the Oxford University Press do not give any annotation. The annotation might be of help to the reference librarian to evaluate a book. But by its absence, he is not very much handicapped as his rich experience enables him to find out whether a book would be suitable to his enquirer.

3 Columbia Books

The Columbia Books 1893-1933 marks a departure from the usual mode of the construction of a publisher's catalogue. It is a dictionary catalogue of all books published by the Columbia University Press. "It represents a successful attempt to apply to an extensive publisher's list the principles and methods on which the modern library catalogue is based. Hence it serves the reference purposes admirably. As Dr. Arthur E. Bestwick, the librarian of the St. Louis Public library says, as far as librarians are concerned it "is certainly a move in the right direction. I.....hope.....it..... will set a precedent for other publishers to follow".

31 JUSTIFICATION

It is interesting to note the arguments of the Columbia University Press for deciding to publish a catalogue of this type.

"Two most important questions which a library catalogue must answer are: What book has the library by a given author; and, What books or other printed material has it on a given subject? It happens that this is also the kind of information which the ordinary book purchaser or user of books wants about a publisher's list; and yet publishers' catalogues have, up to the present time, responded to a very slight extent to the need for easily available information.

"It therefore seems that it is a very distinct and important step in advance for a publisher with as extensive list as that of Columbia University Press to abandon the old-style catalogue and put its list into the form of a dictionary-catalogue, the form which all bibliographical and library experience has shown to be the most useful for all purposes".

F.L. Magel, the president of the American Booksellers Association said of this catalogue "Columbia Books, 1893-1933, does more to help booksellers to sell books than any publisher's catalogue I have ever seen".

4 OXFORD UNIVERSITY PRESS

Thus the feeling that a publisher's catalogue compiled on the methods and principles employed by a modern library catalogue would have a happy reaction on both the librarians and buyers of books has been slowly recognized. The superiority of the classified catalogue over the dictionary catalogue as a reference tool seems also to have been recognized now as will be seen from the following extract from the preface of the 1950 edition of the *General catalogue* of the Oxford University Press. It says:

"The tenth edition of the *General catalogue* of the Oxford University Press breaks with tradition by a change in the arrangement, which has hitherto remained substantially that of the first edition of 1916.

"In this edition the basis of arrangement is that of the Dewey Decimal System of Classification, and the Dewey numbers are printed in brackets after the various headings. It is hoped that the innovation will be found useful".

41 OPEN VARIETY

This catalogue is kept 'open' by a quarterly *Bulletin*, in which the titles are arranged in the same manner, as in the general catalogue.

42 MORE DETAILED CLASSIFICATION

Of late there is also a tendency to sub-divide closely. For instance, the December (1949) issue of the *Bulletin* arranged all books in Politics only under the single heading "Politics (320)". So also the books in Economics were entered only under the single heading "Economics (330)". But in the April (1952) issue of the *Bulletin* in books under Politics have been further sub-divided and arranged under Politics general (320), Foreign relations (327), and Irish Parliament (328·4). Books under Economics have been assigned to the sub-divisions Labour (331), Financial (332), and Production (338).

5 Condition in India

Hardly any bookseller or publisher in India has reached these standards in their catalogues. It may be due either to ignorance of the value of such good catalogues in the distribution of books or to lack of resources to compile such catalogues.

51 POOR REFERENCE VALUE

The production of general books in India is very poor.

Even the few good ones do not reach the hands of all potential readers on account of the poor publicity value of their catalogues. Generally, libraries do not preserve these on account of the absence of any reference value. It is also possible that some good books which should have gone into a few editions die soon after their birth on account of lack of sufficient publicity through catalogues. This is not only a loss to the publisher but also a loss to the reading public and the author.

52 CO-ORDINATED EFFORT

Enterprising publishers in the West like the Cambridge University Press and the Oxford University Press have already recognized the wisdom of conforming to high standards in the production of their catalogues. It is time that the leading Indian Publishers should devote some attention to this problem. A co-ordinated effort is necessary. The Indian Publisher's Association might collaborate with the Indian Library Association. They should set up a Committee to draw up proper standards for the catalogues of Indian publishers so as to make them useful to the reference librarian and the public.

PAPER 2.3

BIBLIOGRAPHY IN GERMANY

Klaus Fischer

[Mentions 127 German bibliographies. Of these 23 have not revived after World War II. The remaining 104 are described under various groups: (1) Periodical, (2) Occasional, (3) National, (4) Union catalogue, (5) Subject of German and international coverage respectively, (6) Abstracting, (7) Reviewing, and (8) Digesting].

1 Introduction

In Germany during World War II many collections of printed books were destroyed by fire. Also, a number of important periodicals were suspended. Whilst it will take a long time to repair the damage, in spite of heavy financial difficulties a great effort was quickly made to revive the learned periodicals

essential for international research (See B. Sticker. *Die Notlage der deutschen wissenschaftlichen Zeitschriften*. Bad Godesberg 1952.) (H. Uhlendahl. *Die Entwicklung der Deutschen Bücherei seit 1945 und ihr gegenwärtiger Zustand*. In: *Zentralblatt für Bibliothekswesen* 65. 1951. p 254. H. F. Schultz. *Das Schicksal der Bücher und der Buchhandel*. Berlin 1952. p.17. Number of German periodicals 1945-47=4339; 1948=6149; 1949=7104; 1950=8639). (H. Widmann. *Bibliographien zum deutschen Schrifttum 1939-1950*. Tübingen 1951.

11 PURPOSE

Documentation and bibliographical work is essential in order to register all the research activities of a country (German examples reviewed in sections 21, 22 and 241), and in order to inform scholars in the country about the production in the world (Examples in German language are given in sections 22, 23 and 242).

12 PERIODICAL BIBLIOGRAPHY

A periodical bibliography may be of the listing, annotating, abstracting or digesting kind (cf. Nos. 79, 80.). They are published weekly, monthly, quarterly or annually and cumulate in greater periods. National bibliographies are arranged by the author and built as dictionary catalogues. Subject bibliographies are mostly classified according to particular systems and indexed by author and subject headings. So nearly always the bibliographical material is listed by author as well as by subject.

13 OCCASIONAL BIBLIOGRAPHY

Besides bibliographies published as independent periodicals, we find bibliographical, abstracting and digesting material appearing occasionally nearly in any learned periodical.

Because of their great number they cannot be exhaustively listed here. Here is an illustrative list.

- | | | |
|----|-----------------|--|
| 24 | Orientalia | 1. Archiv für Ostasien. 1. 1948.
2. Der Islam. 27. 1947.
3. Zeitschrift der Deutschen Morgenländischen Gesellschaft. 99. N.F. 24: 1945-49. 1950. |
| 2 | Library Science | 1. Zentralblatt für Bibliothekswesen. 61. 1947. |
| D | Engineering | 1. Patentblatt. 70. 1950.
2. Zeitschrift des Vereins Deutscher Ingenieure. 90. 1950. |
| J | Agriculture | 1. Zeitschrift für Weltforstwissenschaft. 12. 1948. |
| L | Medicine | 1. Zahnärztliche Mitteilungen. 1949.
2. Zeitschrift für Geburtshilfe und Gynäkologie. 127. 1947.
3. Zeitschrift für Tropenmedizin und Parasitologie. 1. 1949. |
| N8 | Music | 1. Jahrbuch der Musikwelt. The Year book of the music world. Annuaire du monde musical. 1. 1948. |
| P | Philology | 1. Archiv für das Studium der neueren Sprachen. 185 (100). 1948.
2. Deutsche Vierteljahresschrift für Literaturwissenschaft und Geistesgeschichte. 23. 1949.
3. Germanisch-romanische Monatsschrift. 1950. |

- | | | |
|---|-------------------------|--|
| S | Psychology and Sexology | 1. Psyche. 1. 1947.
1. Internationales Magazin für Sexualprobleme. 1. 1949.
2. Zeitschrift für Sexualforschung. 1. 1950. |
| T | Pedagogics | 1. Bildung und Erziehung. 1. 1948.
2. Die Schule. 1. 1946. |
| U | Geography | 1. Petermanns geographische Mitteilungen. 92. 1948.
2. Zeitschrift für Raumforschung. 8. 1949. |
| V | History | 1. Germania. Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts. 28 : 1944-50. 1950.
2. Historische Zeitschrift. 169. 1948. |
| X | Economics | 1. Handbuch der Finanzwissenschaft. 1. 1950. |
| Z | Law | 1. Jahrbuch des Rechts. 1. 1948.
2. Jahrbuch für internationales und ausländisches öffentliches Recht. 1. 1948. |

2 Bibliographical List

Bibliographical lists report only titles of books or articles ; sometimes a few lines point out in an annotation the general tendency of the publication without trying to give a real abstract. Such lists fall into six groups :

- 1 Union catalogue of book-trade i.e. of publishers and/or booksellers ;

National Omnibus bibliography covering the entire universe of knowledge ;

- 3 Subject bibliography covering a single region of knowledge ;
- 4 List of periodicals ;
- 5 Index to periodicals ; and
- 6 Author bibliography covering the works on and by a single author or a group of authors.

21 UNION CATALOGUE OF BOOK-TRADE

Publishers advertise their new books in the "Borsenblatt" coming out in both East and West Germany. Also booksellers, "Sortimenter", inform the public and the librarians through their own particular lists. These too are of bibliographical importance.

- 1 Börsenblatt für den deutschen Buchhandel. Frankfurt am Main 1. 1945—
- 2 Börsenblatt für den deutschen Buchhandel. Leipzig 113. 1946—
- 3 Barsortimentslagerkatalog. Koch, Neff and Oettinger. Stuttgart 1949—
- 4 Bücher für Klinik und Praxis. Lagerkatalog. Mainz 1950/51—
- 5 Libri. Barsortimentslagerkatalog. Lingenbrink. Rastatt—1949—

22 NATIONAL OMNIBUS BIBLIOGRAPHY

The foundation of any library system is the National Bibliography registering the whole production of the country. Press Registration Act or the German "Pflichtexemplar" prescribes that any book or periodical of the country is to be available in a particular State Library. Germany, separated into West and East, and for the moment without a common National Library, faces the difficulty of being forced to register the pro-

duction in both the West and the East. Usually a material is registered in both regions. Before the war, Leipzig and Berlin were the bibliographical centres. Today Leipzig is the centre for the East. Frankfurt is the centre for the West. In former times, the national bibliography was published as a daily. Now it is a weekly. It is regularly indexed and cumulated into a decennial bibliography. East Germany has its own bibliography of Government publications.

Examples

- 1 Bibliographie der Deutschen Bibliothek Frankfurt am Main. Frankfurt a. M. 1947—
- 2 Deutsche Nationalbibliographie. Leipzig. 1945—
Reihe A. Neuerscheinungen des Buchhandels.
Reihe B. Neuerscheinungen außerhalb des Buchhandels.
- 3 Jahresverzeichnis des deutschen Schrifttums. Leipzig 1945-46; 1948.
- 4 Neuerscheinungen der DDR. Leipzig 1951—

23 SUBJECT BIBLIOGRAPHY

Special subjects are covered by particular bibliographies.

Examples

- 1 Börsenblatt für den deutschen Buchhandel. Beilage: Bibliographie der Kunstblätter. Leipzig 15-17. 1945-47. 1948.
- 2 Deutsche Musikbibliographie. Leipzig 118/119. 1945-47. 1947.
- 3 Jahresverzeichnis des deutschen Hochschulschrifttums. Leipzig 61-64: 1945:48. 1951.

24 PERIODICALS LIST

Besides the bibliographies of section 22, there are some publications which list only periodicals and newspapers, adding notes on editors etc.

Examples

- 1 Anzeigen-Fackler. Zeitungskatalog. Munchen 1949.
- 2 Handbuch Deutsche Presse. Ausg. 2. Bielefeld 1951.
- 3 Sperlings Zeitschriften-und Zeitungsadreibbuch. Leipzig 62. 1947.
- 4 Zeitungskatalog. Frankfurt am Main 1950.

25 INDEX TO PERIODICALS

To make full use of the large quantity of periodical publications, research workers need subject indexes. Among such indexes produced in several countries, the German ones are acknowledged to be the best.

Example

- 1 Internationale Bibliographie der Zeitschriftenliteratur. Osnabrück. Abt. A. Bibliographie der deutschsprachigen Zeitschriftenliteratur. 97: 1947-48. 1949.

251 International Coverage

Series B of the index to periodicals mentioned above covers international production whilst nearly all similar publications of other countries restrict themselves to periodicals issued only to their native language:—

- 1 Internationale Bibliographie der Zeitschriftenliteratur. Osnabrück. Abt. B. Bibliographie der frendsprachigen Zeitschriftenliteratur. N.F. Bd 30, 1949-50—

26 AUTHOR BIBLIOGRAPHY

Reference books on writers of all kinds are published within a space of some years. They list books and periodical articles of poets and research workers.

Examples

1. Kürschners Deutscher Literaturkalender . Berlin and Stuttgart. 52 1952.
2. Kürschners Gelehrtenkalender. Berlin 7. 1950.

3 Union Catalogue

Germany is well known as a country which has developed Union Catalogue of outstanding quality for its library holdings. During the war, these catalogues were destroyed. The books registered in them were also destroyed. Immediately after the end of the war, German librarians and scholars started work on a new Union Catalogue.

31 NATIONAL COVERAGE

At first we quote a list registering monthly books issued in foreign countries on any subject and acquired by German libraries. Next we notice a similar publication, supplement to an art journal, restricting itself to foreign art publications available in Germany. Finally we mention an independently published list registering periodical publications on geological subjects.

Examples

1. Zentralkatalog der ausländischen Literatur. Z K A. Monatliches Verzeichnis der von Deutschen Bibliotheken erworbenen seit 1939 im Ausland erschienenen Bücher. Köln 1. 1951.
2. Kunstchronik. Beiblatt. Nachweis ausländischer Literatur in deutschen Bibliotheken. Nürnberg 1. 1949.
3. Verzeichnis der an deutschen Instituten und Bibliotheken vorhandenen geologischen—paläontologischen—mineralogischen—petrographischen Zeitschriften. Kiel 1947.

32 REGIONAL COVERAGE

Many University Libraries, State Libraries and Special Libraries publish lists of their accessions in books and periodicals.

Examples

- | | |
|------------------------------------|---------------------------|
| 1 Aachen | 8 Karlsruhe |
| 2 Berlin-Dahlem | 9 Kissingen (Meteorology) |
| 3 Bonn | 10 Köln |
| 4 Dresden | 11 Leipzig |
| 5 Frankfurt am Main
(Sociology) | 12 Leverkusen (Chemistry) |
| 6 Freiburg i. Br. | 13 Speyer |
| 7 Hamburg | 14 Stuttgart |
| | 15 Würzburg |

4 Micro-Thought Bibliography**41 GERMAN COVERAGE**

The following publications display in a systematic manner books and articles of German origin, in their respective subjects.

- | | |
|--------------|--|
| N Fine Arts | 1 Schrifttum zur deutschen Kunst. Berlin 11. 1943. 45. 1950. |
| R Philosophy | 1 Schopenhauer—Jahrbuch. Mit Schopenhauer—Bibliographie. Minden 32. 1945-48. 1948. |
| V History | 1 Der Schlüssel. Gesamtverzeichnis mit Ortsquellennachweisen für genealogisch-heraldisch-historische Zeitschriften-reihen. Göttingen 1949. |
| | 2 Veröffentlichungen der Gesellschaft für fränkische Geschichte. Reihe 11. Bücherkunde der fränkischen Geschichte. Würzburg 1. 1948. |
| Z Law | 1 Bibliographie deutscher Gesetze. Berlin 1. 1948. |
| | 2 Deutsche Gesetzesliste. Sonderveröffentlichungen der Neuen juristischen Wochenschrift. Berlin 1. 1947/48. |
| | 3 Gesetz und Recht. Sammlung seit 8. V. 1945 erlassener Rechts-sätze. Hamburg 1. 1947. |

- 4 Lippas Führer durch die juristische Literatur. Berlin-Friedenau 1948.
- 5 N-J-W-Fundhefte. Systematischer Nachweis der deutschen Rechtssprechung und Zeitschriftenaufsätze. München 1. 1950.

42 INTERNATIONAL COVERAGE

Subject bibliographies of international coverage are of high value. They provide scholars with a necessary medium of communication.

Examples

- | | |
|-------------------|--|
| F Technology | Führer durch die technische Literatur. Verzeichnis der wichtigsten Werke aller technischen Gebiete für Studium und Praxis, unter besonderer Berücksichtigung der neuesten und in den nächsten Monaten fertig werdenden Erscheinungen. Hannover 37. 1950. 1949. |
| J Agriculture | <ol style="list-style-type: none"> 1 Agrarbibliographie. Hamburg 1945/46. 2 Agrarmeteorologische Bibliographie. Bod Kissingen 1. 1949. 3 Die Fachpresse der Land- und Ernährungswirtschaft. Hamburg 1950. |
| P Linguistics | 1 Indogermanisches Jahrbuch. Berlin 27. 1941. 1948. |
| T Adult Education | 1 Schriftenreihe zu Fragen der Erwachsenenbildung. Darin. Bibliographie der Erwachsenenbildung mit besonderer Berücksichtigung des Volkshochschulwesens. Halle 1. 1949. |
| V Archaeology | 1 Jahrbuch des Deutschen Archäologischen Instituts. Beilage. Archäologische Bibliographie. Berlin 1944-48. 1950. |

- X Economics 1 Jahrbuch für Sozialwissenschaft und Bibliographie der Sozialwissenschaften. Göttingen 1. 1950.

5 Abstracting Periodical

Abstracting periodicals include some entries of bare titles of books also. In some cases annotations are provided. These happen in the case of whole books. But abstracts of articles found in periodicals form their distinguishing feature. Often, these abstracts give the necessary information to research-workers. This saves them the trouble of procuring the originals and perusing them in their entirety.

51 GERMAN COVERAGE

For both German and foreign students those abstracting periodicals are of considerable value in the study of current German output of thought.

Examples

- P German Philology 1 Zeitschrift für deutsches Altertum und deutsche Literatur. Mit. Anzeiger für deutsches Altertum und deutsche Literatur. Wiesbaden 64. 1948-50.
- T German Adult Education 2 Aussprache. Zweimonatsschrift für die gewerk-schaftliche Bildungsarbeit. Beilage: Literaturblatt für die gewerk-schaftliche Schulung und Bildung-sarbeit. Düsseldorf 1. 1949.
- V German History Schrifttumsberichte zur Genealogie. Literatur bericht. Berchtesgaden 1. 1951.
- Z German Law Rechtsprechung und Schrifttum. Sammlung sämtlicher Entscheidungen und des Schrifttums auf dem Gebiete des Justiz- und Verwaltungsrechts. Nürnberg 1. 1949.

511 Reviewing Periodical

There are reviewing periodicals devoted to particular subjects. Some are devoted to contemporary German poetry. Foreign fiction is reviewed according to original first issues as well as German translations. These have considerable bibliographical value.

Examples

- 1 Bücherei und Bildung. Bremen. 1. 1948/49.
- 2 Das literarische Deutschland. Heidelberg 1. 1950.
- 3 Welt und Wort. Literarische Monatsschrift mit ausführlichem Bericht über die Neuerscheinungen des internationalen Büchermarkts. Tübingen 1. 1946.
- 4 Weltstimmen. Weltbücher in Umrissen. Stuttgart 18. 1948/49. 1949.

512 Omnibus Reviewing Periodical

One periodical is reviewing newly issued books on all subjects—sciences as well as humanities. It is *Forschungsberichte*. After World War I, it was split into two—covering science and humanities respectively. It acquaints German research workers especially with outstanding results of foreign studies. The reviews are grouped by subjects.

Example

- 1 Deutsche Literaturzeitung für Kritik der internationalen Wissenschaft. Berlin 66-68. 1945-47. 1947.
- 2 Wissenschaftliche Forschungsberichte. Geisteswissenschaftliche Reihe. Bern 15. 1949. Naturwissenschaftliche Reihe. Frankfurt am Main 58, 1950.

In a similar manner special subjects are treated also in publications called

- 3 Forschungsberichte (.....der Botanik—Diagnostik—Zoologie etc.)

52 INTERNATIONAL COVERAGE

Germany has been a pioneer in the production of abstracting periodicals of international coverage.

Examples

- | | | | |
|-----|------------------|---|--|
| z4 | Oriental studies | 1 | Asienbibliographie. Frankenau 1. 1949. |
| z58 | Soviet Russia | 1 | Die neue Gessellschaft. Beilage. Bibliographie der die Sowjetunion betreffenden deutschsprachigen Literatur. Berlin 1. 1947. |
| B | Mathematics | 1 | Zentralblatt für Mathematik und deren Grenzgebiete. Berlin 29. 1948. |
| B9 | Astronomy | 1 | Astronomische Jahresberichte. Berlin 44. 1942. 1947. |
| C | Physics | 1 | Physikalische Berichte. Wiesbaden 26. 1947. |
| E | Chemistry | 1 | Chemisches Zentralblatt. Vollständiges Repertorium für alle Zweige der reinen und angewandten Chemie. Berlin 114. 1943. 1947.
Weinheim 118. 1947—120.1949. |
| F6 | Technology | | Technische Fortschrittsberichte. Dresden 11. 1951. |
| G | Biology | 1 | Berichte über die gesamte Biologie. Berlin. Abt. A. Berichte über die wissenschaftliche Biologie. 64. 1948. Abt. B. Berichte über die gesamte Physiologie und experimentelle Pharmakologie. 135. 1948. |
| | | 2 | Fortschritte der Zoologie. Jena 8:1942-44.1947. |
| | | 3 | Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Jena 147. 1949. |

- | | |
|-----------------------|---|
| H Geology | 1 Zentralblatt für Geologie und Paläontologie. Stuttgart. Teil 1. Allgemeine und angewandte Geologie einschließlich Lagerstattengeologie und regionale Geologie. 1948. Teil 2. Historische Geologie und Paläontologie. 1950.
2 Zentralblatt für Mineralogie. Stuttgart. Teil 1. Kristallographie und Mineralogie. 1945. Teil 2. Gesteinskunde, technische Mineralogie, Geochemie und Lagerstättenkunde. 1945. |
| 3 Veterinary Medicine | 1 Veterinarmedizin. Gesammelte Referate aus allen Gebieten der Tierheilkunde. Konstanz 1. 1948. |
| L Medicine | 1 Albrecht von Graefes Archiv für Ophthalmologie. Referatenteil. Zentralblatt für die gesamte Ophthalmologie und ihre Grenzgebiete. Berlin 50. 1949.
2 Archiv für Dermatologie und Syphilis. Referatenteil. Zentralblatt für die gesamte Neurologie und Psychiatrie. Berlin 72. 1948.
3 Archiv für Psychiatrie und Nervenkrankheiten. Referatenteil. Zentralblatt für die gesamte Neurologie und Psychiatrie. Berlin 107. 1949.
4 Berichte über die allgemeine und die spezielle Pathologie. Berlin 1. 1948/49.
5 Deutsche Zahn-, Mund- und Kieferheilkunde mit Zentralblatt für die gesamte Zahn-, Mund- und Kieferheilkunde. Leipzig 11. 1948/49.
6 Pro Medico. Ärztliches Referatenblatt. Mainz 16. 1947. |

- 7 Zentralblatt für die gesamte Tuberkuloseforschung. Berlin 57. 1950.
 - 8 Zentralblatt für Hals-, Nasen- und Ohrenheilkunde sowie deren Grenzgebiete. Berlin 38. 1948/49.
 - 9 Zentralorgan für die gesamte Chirurgie und ihre Grenzgebiete. Berlin 111. 1948/49.
- L214 Dentistry 1 Die Quintessenz der fahnärztlichen Literatur. Berlin-Charlottenburg 1950.
- P Linguistics 1 Indogermanische Forschungen. Zeitschrift für Indogermanistik und allgemeine Sprachwissenschaft. Dazu : Indogermanischer Anzeiger. Berlin 59. 1948.
- Q Theology 1 Kirche in der Zeit. Beilage. Evangelischer Literaturbeobachter. Düsseldorf 1. 1949/50.
- 2 Theologische Literaturzeitung. Berlin 72. 1947.
- 3 Theologische Revue. Münster 44, 1948
- 4 Verkündigung und Forschung. Theologischer. Jahresbericht. München 1943-46 : 1946/47
- R Philosophy 1 Philosophischer Literaturanzeiger. Schelchdorf 1. 1949.
- U Geography 1 Geographisches Jahrbuch. Gotha 58. 1943-47. 1948.
- X Economics 1 Bibliographie der Weltpresse. Dokumentation wirtschaftlicher und technischer Artikel der in- und ausländischen Fachpresse. Hamburg 1. 1949.

- Y71 Archaeology and classical philology 1 Gnomon. Kritische Zeitschrift für die gesamte Altertumswissenschaft. München 21. 1949.

6 Digest

Digests try to give more than list and abstracts. They select. They also correlate what is selected. They feature the thought-content from thought.

Examples

- A Science 1 Auszüge aus Dissertationen der Naturwissenschaftlichen Fakultät der Technischen Hochschule Hannover. Hannover 1949.
- 03 Fiction 1 Story. Monatsschrift der modernen Kurzgeschichte. Autoren aus aller Welt. Erzählungen unserer Zeit. Tübingen 1950.
- Y Pologne 1 Deutsches Büro für Friedensfragen. Ausgewählte Berichte aus polnischen Zeitungen und Zeitschriften über die deutschen Ostgebiete (Wissenschaft, Wirtschaft, Siedlung). Stuttgart 1. 1949.

7 Post-War Conditions

Germany informs the countries of the whole world about her publications. It also makes accessible to her scholars and librarians international literature.

71 DUPLICATION

Post-war Germany faces the great difficulty of general international scarcity in financial means for library service. To add to this she has the particular trouble of being forced to publish the same material twice—for West and East Germany

separately. The most expensive abstracts of chemistry were for long printed in both West and East. Now, an agreement has been reached. This duplication will hereafter be avoided. The National Bibliographies still continue to be published in two different places.

72 LOSS OF PLACE

Before the war, some German bibliographical and abstracting periodicals were leading in international standard. During the war and in the beginning of post-war time, when Germany was handicapped, old publications of foreign countries got the advantage. And new foreign publications superseded old German ones. *Chemical abstracts* Boston, (42, 1948) has stolen a march over the *Chemisches Zentralblatt*. *Mathematical reviews*, Lancaster (1, 1949) was started to replace the not-yet-revived German *Hydrologische bibliographie*. Besides the famous *Zentralblätter* of Springer, published in Berlin, Göttingen and Heidelberg, there is a new form of medicinal abstracts in the *Excerpta Medica*, Amsterdam, (1, 1948).

73 REVIVAL

In several subjects, however, well known German abstracting periodicals are still missed by international research work. They have not been superseded by new ones. *Geographisches Jahrbuch* has been revived to complete by abstracts the bare-list bibliography of the *Bibliographie géographique internationale*, Paris (54, 1940-44, 1947). Scholars are eagerly waiting for the revival of "Bursians Jahresberichte," as an urgently needed abstracting periodical to cover the field which is now served by the bare-list pure bibliography of *Année philologique*. *Bibliographie critique et analytique de l'antiquité gréco-latine*, Paris (19, 1948, 1950).

74 SUSPENSION CONTINUES

The following is a list some bibliographical and abstracting German periodicals, suspended during the war and not yet

revived. All of them are expected to come out again. We give the volume and year of suspension.

- z4 Oriental .. Jahresbericht der Deutschen Orient-
Studies gesellschaft. 1941. Orientalische Li-
teraturzeitung. 47. 1944.
- 45 Journalism .. Zeitungswissenschaft 17·1942.
- B Mathematics .. Jahresberichte über die Fortschritte
der Mathematik. 68. 1942. 1944
- D53 Aerology .. Bibliographie der aerologischen Li-
teratur. 11. 1943. 1944.
- D66 Electrotech- .. Elektrotechnische Berichte. 24. 1945.
nics
- D666 German .. Rundfunkarchiv. Beilage. Deutsches
Broadcasting Rundfunkschrifttum. 13. 1942.
- F Technology .. Technische Zeitschriftenschau mit
Bücherschau. 29. 1944.
- G:55 Hydrology .. Hydrologische Bibliographie 5. 1942.
- I Botany .. Bibliographie der Pflanzenschutzlitera-
tur. 21. 1939.
- P113 German .. Jahresbericht über die Ersch-
Philology einungen aus dem Gebiet der
germanischen Philologie. N.F. 15. 1935.
1939. Jahresbericht über die Ers-
cheinungen aus dem Gebiet der neuen
deutschen Literatur. 15. 1939.
- P12 Romanic .. Zeitschrift für romanische Philologie.
Philology Supplement-hefte. 58/59. 1938/39.
1943.
- P13 Classic philo- .. Bursians Jahresberichte über die Fort-
logy schritte der klassischen Altertums-
wissenschaft. 284. 1943. Beiblatt.
Bibliotheca philologica classica. 65.
1938. 1941.
- Q Theology .. Theologische Literatur. 22 1942. 1943.

- S Psychology .. Zeitschrift für Psychologie. 156. 1944.
 T Pedagogics .. Erziehungswissenschaftliche Forschung.
 Padagogische Gesamtbibliographie 36.
 1941. 1943.
 U Geography .. Geographischer Anzeiger. 45. 1944.
 V History .. Jahresbericht der Geschichtswissenschaft. 14. 1938.
 V1:7 Prehisistroy ... Quartär. 4. 1942.
 V55:7 German .. Nachrichtenblatt für deutsche Vor-
 Prehistory zeit 19. 1943
 V99 Ibero- .. Ibero-amerikanische Bibliographie. 52.
 American 1944.
 Studies
 Y Anthropolo- .. Anthropologischer Anzeiger. 19. 1943.
 gy
 Y:3 Folklore ... Volkskundliche Bibliographie. 1935-36
 1941.
 Z Zoology .. Zoologische Berichte. 55. 1943/44.

8 International Economy and Efficiency

Many countries have started parallel publications. In order to avoid waste of effort and money, scholars and librarians ought to be able to co-ordinate their bibliographical efforts. It is desirable to have one and only one highly specialised and exhaustive abstracting periodical for each subject.

81 NEW INTERNATIONAL ORGANISATION

For the moment any special research institute or any universal library is forced to acquire a large number of periodical publications covering the same field. As soon as international co-operation is reached, international bibliographical, abstracting and digest periodical publications could be exchanged between countries. A new type of organisation is to be set up so that anybody can be sure of finding complete documentation of his subject everywhere in the world. An outline for such a new type of international organisation has been sketched in the *Classification and international documentation* published in the *Review of documentation* of FID, 14, 1947, 154-177.

PAPER 2·4

INDOLOGY

J. N. Krishna Iyengar

[Mentions catalogues of manuscripts as important reference materials in Indology. Refers to the inadequacy of linguistic dictionaries, closed and open bibliographies and encyclopaedias in the field].

1 Introduction

Indology has been defined as the study of languages, literature, philosophy, history, customs etc of India. This term first appeared in *Trubner's monthly list* of Oct. 1888, in the following statement. "There is not a single branch of Indology with perhaps the single exception of Vedic studies, which will not gain very considerably by its publication." The cross section of this universe of knowledge was cultivated during the nineteenth century mostly by scholars of non-Indian origin. In his paper on the subject published in the *Memoirs* of the Madras Library Association, 1940, C. Sundaram lists 68 bodies found in several countries between 1784 and 1939 for the study of Indology. The first of these was the Asiatic Society of Bengal, the latest is the Sri Venkatesvara Oriental Research Institute, Tirupathi. From the beginning of the twentieth century, the bodies founded in India began to attract Indian scholars. After World War I, about eight bodies have been found through the enterprise of Indians themselves. A review of the reference materials on Indology appeared under the title *Highways and byways of reference works* by S.R. Ranganathan and K.M. Sivaraman in the *Memoirs* of the Madras Library Association, 1941. Sundaram gives several case-studies demonstrating the handicap of reference service in Indology caused by the absence of suitable reference materials. One would expect Indology reference materials of several forms. These are discussed below :

2 Catalogue of Manuscripts

Many Indian classics in diverse subjects have not yet been brought to print. Some of those already printed are in need

of being edited, in the light of newer manuscripts brought to light. This fact underlines the importance of catalogue of manuscripts. About 107 public or near-public institutions are depositories of these manuscripts apart from several private families and individuals. 28 of these institutions have published their catalogues. A list of these and of several reports on search for manuscripts and of handlists of manuscripts will be found in pages iii-xxix of the *New catalogus catalogorum* (Madras University, Sanskrit series, 18), 1949. Unfortunately this list is remarkable for the unhelpful nature of its arrangement.

21 CUMULATIVE CATALOGUE

A comprehensive work of reference in regard to manuscripts in Indology has been for long the *Catalogus catalogorum*, 3 V, 1891, of Theodor Aufrecht. This is now being revised by the University of Madras under the title *New catalogus catalogorum of Sanskrit manuscripts*. The work has been in progress since 1935. The first volume, covering only the first letter of the alphabet, was published in 1949.

3 Dictionary

Linguistic dictionaries form an important class of reference material. Most of the current dictionaries are a result of casual growth. There are many regions left blank. A list of the important dictionaries of value for Indologists will be found in pages 264-280 of the *Bibliography of reference books and bibliographies* (Madras Library Association, publication series, 10), 1941, by S.R. Ranganathan and K.M. Sivaraman.

4 Cyclopaedia

There are few encyclopaedias covering the whole range of Indology. Even of the existing ones, few are in Indian languages. *Vachaspathiyam* and *Sabda kalpadruma* were early attempts in Sanskrit, though they are not encyclopaedias in the strict sense. Marathi was the first modern language to produce an encyclopaedia. Tamil has started work on its own. There is

also a plan for Telugu taking up similar work. Classical dictionaries form a specialised form of encyclopaedia.

5 Bibliographical periodical

Except for the one published by the Kern Institute, Leyden, no annual or other periodical bibliography has continued to exist. The attempts of Fernandez and of the Konkan Institute of Arts and Science of Bombay are praiseworthy.

6 Bibliography

Closed bibliographies have been published on several topics. But these form only a fraction of what is needed for effective reference service in Indology. The most important of such closed bibliographies are listed by Ranganathan and Sundaram. R.N. Dandekar's *Vedic bibliography* (1946) is an important recent edition.

7 Concordance

A great handicap in the use of even the published classics of Indology is the absence of concordance. Some of the classics do not even give a helpful index. Indexes of certain classics are caught up in the pages of periodicals. These are virtually lost to many readers and even libraries.

8 Revision of List

The list of Ranganathan and Sivaraman is already out of date by 12 years. There should be an organisation to bring it up-to-date from time to time. We do expect reference materials on Indology to accumulate more rapidly than hitherto. The *Puranas* form a vast field quite uncharted till recently. The following three recent publications will give some relief to reference librarians in serving information on the *Puranas* :—

- Ramachandra Dikshitar (V.R.). *Purana index*. 2v.
University of Madras, historical series, 19. 1951.
- Karmarkar (A.P.). *Puranic words of wisdom*. 1947.
Bharati Vidya Bhawan, Bombay.
- Mankad (D.R.) *Puranic chronology*. 1951.

PAPER 2-5

MARATHI REFERENCE MATERIAL

V.P. Kolhatkar

[Gives a narrative account of the chief reference aids in Marathi—Bibliography, Encyclopaedia, Biography, Linguistic Dictionary (General and technical). Points out the absence of subject bibliography. Appeals for the production of a variety of reference materials on diverse subjects to meet the demands of the awakening masses of Maharashtra].

1 Reference Books

The information that can be given to readers immediately is often available in some important volumes which unfailingly help us many times even in a day. Such volumes are generally termed reference aids. These help us in Ready Reference Service. They deal with a variety of subjects. They are of various sizes. Their cost too varies over a considerable range. Some get themselves seated flat in a box; others hang against a wall; a few may need a *charpoy* to rest on. Some prefer erect position on a stand. We have to be very careful while removing them from their resting place as also while keeping them back. Any carelessness or negligence or less regard in this matter may harm them. We have to be very vigilant about their presence in the library or else their disappearance results in our inconvenience. They are like Lord Krishna about whom it is said, "He confers on His devotees what they pray for, taking into account the intensity of their devotion". Reference aids may also be likened to the *Kalpataru* (the Tree of Plenty). If we sit under the *Kalpataru* and go on wishing for anything, good, or bad, we get those things. We must exert ourselves to think. If we sit regardless of it, we do not and cannot enjoy its blessings. The reference books are the "Kings' Treasuries" as Ruskin says and abound in rich wealth of thought. And naturally therefore we must always be particular about their preservation and protection from thieves and worms. We must see that their proper use increases.

2 Types of Reference Books

In general all the reference books can be grouped under the following heads:— (1) Bibliography, (2) Encyclopaedia, (3) Year book, (4) chart, map, graph, formula, (5) Handbook, (6) Dictionary of languages, (7) Technical Directory, (8) Calendar, Time-table, (9) Syllabus of educational institution.

3 Bibliography

There have been four attempts at making an exhaustive Marathi Bibliography.

31 SHAMRAO MOROJI

The pioneer bibliography was Shamrao Moroji's lithographed book published in 1859. It has 93 pages. It lists Sanskrit, Marathi, Hindusthani and Gujrati books produced till then.

32 RANADE

The second appeared in 1864. This was compiled by the late Hon'ble Justice M.G. Ranade. It has also a note on the growth of Marathi language. According to it 661 books were published during the 46 years that followed the decline of Maratha supremacy i.e. between 1818 and 1864. Out of these 661 books, 431 were in prose, 230 were in verse. Out of these, 98 were just text-books meant for different classes of formal institution. It is important to note that the first text-books were prepared after 1840 by Jarvis, Candy, Chhatre, Jambhekar, Dadoba Pandurang and Bhaskar Damodar.

33 Y.R. DATE AND SARDESHMUKH

After this there appeared in 1918 a big volume jointly compiled by Y.R. Date and R.T. Sardeshmukh under the auspices of the Maharashtra Dnyanakoshā Mandal (the Maharashtra Encyclopaedia Society). It has 585 pages and covers the 107 years from 1810 to 1917. It has its own classification system. It records the names of over 5,000 authors and

10,000 titles. About 1,000 of the titles represent the period between 1810 and 1890 and over 9,000 books seem to have been added thereafter. The Original price of the volume was only Rs. 5.

34 S.G. DATE

In 1944 came the latest *Marathi bibliography* by S.G. Date. The compiler worked single-handed, studied the principles of compiling a bibliography, and produced this bi-partite volume consisting of over 1,150 and 376 pages separately. This attempt is magnificent and epoch-making. It meets a great need of our libraries. Of the two parts of this work, the first contains all the desirable and pertinent bibliographical data of over 18,000 Marathi publications brought out since 1800. Most of the entries are annotated. The entries are classified according to a systematic classification scheme—the Decimal Scheme which was the only scheme generally known to us till 1940. The work is in 1,528 pages of super-royal 8vo size. The index part records all the names of authors, titles and names of biographees in one alphabetical sequence. Upto 1890 about 1,000 books have been traced. Between 1890 and 1917 about 9,000. After 1917 and till 1937 over 9,000 publications have come out. Thus this appears to be a complete attempt laying a sure foundation for the future bibliography-compilation of Marathi literature which is growing very rapidly. The volume costs Rs. 60/-.

34I INCUNABULA

The list of Marathi incunabula which occurs at the beginning is really invaluable. A.K. Priolkar's *Dolamudriten* (=Marathi incunabula) is worth special mention.

35 CONTINUATION

The compiler, S.G. Date, has lately completed his search upto 1950. Stray attempts are being made by the Maharashtra Library Association's monthly organ *Sahitya sahakar* to carry

this work further. But the meagre appearance of the lists proves the necessity of greater and more methodical effort. This requires finance.

36 PERIODICALS BIBLIOGRAPHY

The late Mr. R.G. Kanade, a sub-editor of the daily *Dnyanprakash* of Poona has written *Marathi niyatalikancha itihās*. It traces the development of Marathi periodicals from 1832 to 1937. Lately Mr. V.K. Joshi of the Bombay State Secretariat Record Office has brought out *Vrittapatrancha itihās* V.I. Mr. R.K. Lele is his collaborator. These two form the only bibliography of periodicals in Marathi.

37 SUBJECT BIBLIOGRAPHY

Subject bibliography, including analytical entries for micro-thought embodied in articles in periodicals and in parts of books has not yet been attempted in Marathi. This will become necessary only when Marathi is used as the medium of thinking and communication among those engaged in research.

4 Encyclopaedia

41 MAJOR ONES

The first methodical work in Marathi encyclopaedia was by Dr. S.V. Ketkar, Y.R. Date, C.G. Karve and others who collaborated in bringing out the 23 volumes of the *Maharash-treeya dnyanakosha*.

V 1 to 21 contain the main body of diverse information ; V 22 gives a profuse, systematic index and V 23 pictures India's past, present and future. One wonders at the pains and patience with which this voluminous work was carried through to completion during a long period of over 12 years of ceaseless effort. The last volume came out in 1927. Originally the set cost Rs. 175/- only. This work forms a landmark in the modern history of encyclopaedias in India. Then came the

Vyavaharik dnyanakosha in 5 volumes edited by G.R. Bhide of Kolhapur. The latest and more compact work is the *Sulabha vishwakosha* in 6 volumes by the veterans Y.R. Date and C.C. Karve of the first *Maharashtreeya dnyanakosha*. The last volume of this work gives an appendix of Scientific English-Marathi terminology. This has a much closer appropriateness to Marathi than the terminology improvised by the Nagpur Academy.

42 CHILDREN'S ENCYCLOPAEDIA

The works cited above are in big volumes containing about 1,000 pages each. There are some other books mainly compiled for school-going children. V.G. Apte, the first editor of the *Ananda*—the popular periodical for children—, wrote the *Vividha dnyanasangraha* which costs only Re. 0-8-0. *Samanya dnyanadeepika* by K.N. Bhide of Akola, *Samanya Dnyana* by G.G. Kanetkar of Jabalpure, *Mulache vyavaharik dnyana va samanya mahiti* by V.N. Gondhalekar of Poona are useful children's cyclopaedias.

5 Biography

Raghunath Bhaskar Godbole has compiled two very important volumes (1) *Bharatkhandacha arvacheen kosha*, and (2) *Bharatvarsheeya pracheen aitihasik kosha* giving details of lives and places in the past as well as present. G.D. Khanolkar has brought out the first three volumes of his *Arvacheen Marathi wangmaya sevak*. This awaits to be completed. Siddheshwar-shastri Chitrao has edited three big volumes entitled *Bharatvarsheeya* dealing with ancient, medieval and modern periods. The *Vidnyanbodh* of Prof. S.M. Mate gives biographies of scientists of international fame.

6 Year book

Some 20 years ago, the Maharashtra Samvatsarik Mandal of Poona had brought out the *Maharashtra samvatsarik* successively for two years (1933 and 1934). These were edited by Prof.

S.M. Mate. But unfortunately this was not continued as probably the sale was not very encouraging.

7 Physical Culture

D.C. Mujumdar of Baroda was the first to produce an encyclopaedia on a special subject. It is on Physical Culture. It is *Vyayam jnana kose*, 10 v.

8 Linguistic Dictionary

The *Hindi-Marathi and Marathi-Hindi kosha* edited by G.R. Vaishampayan and another similar one by Shreepad Joshi, the *Farsi-Marathi kosha* of Dr. M.T. Patwardhan will ever help reference service. The common Marathi dictionaries are, e.g., V.G. Apte's *Marathi shabdaratnakar*, V.V. Bhide's *Saraswati kosha* in two volumes, *Marathi shabdakosha* by Y.R. Date and C.G. Karve are worth special mention. *Marathi bhasheche waksampradaya wa Mahni* and *Waksampradaya kosha* are useful in tracing the phrases, etc. of our language.

In selecting dictionaries we have to give particular attention to their authenticity. We have, also to see whether the words enumerated are enough for our purpose. Some of these books are partial. They accept only words used in higher society. But like the mother Ganga, for use in a common public library, a dictionary should record each and every word used by the community at large without any exception.

81 TECHNICAL DICTIONARY

We have also dictionaries for the terminology of different classes of knowledge, e.g., the scientific terminology, the terminology of Music, of Religion, of Psychology, of Politics, of Economics and of Law. Every branch of knowledge has its own terms in vogue. Of these many have been collected and published. Y.R. Date and C.G. Karve have compiled the *Shastreeya paribhasha* (i.e. Botanical). The Srishtidnyana has given two similar books on Physics and Chemistry. Hiwargaonkar and Gokhale have prepared a dictionary of terminology of Engineering. Sahasrabudhe and Patankar

have compiled a dictionary of Medical terminology. Prof. D.D. Wadekar has brought out his *Tarkashastreeya paribhasha wa Bharatetya manasashastra paribhasha*, a dictionary of Logic and Indian Philosophy.

9 The Need

Big centres like Bombay, its suburbs, Poona and a few other cities will require volumes in English to answer inquiries from readers daily if not every hour. Some other centres, probably the district towns of population of over twenty thousand, may occasionally have to refer to such materials in English. Taluka towns and a majority of the small towns can use such foreign reference materials only rarely. The majority of readers will be benefited only by reference materials published in Marathi. There is a very great scope to plan, prepare and improve upon subject bibliographies, biographies, yearbooks, technical cyclopaedias and terminological dictionaries. Older works really deserve all honour as pioneers. Newer additions have to be made in accordance with modern method to make the new publications and editions up-to-date as far as possible. No written matter meant to include newer information can be up-to-date for ever. Students and writers of a subject have to take up the clue of the existing works and develop the subject as and when possible and practicable to a deeper level. We want a greater variety and number of reference books to help this. In years to come it can be hoped that the Marathi Language will be in a position to claim all types of reference materials, as the rich English language has already done.

PAPER 2·6

REFERENCE MATERIAL IN TELUGU

T. Gopalakrishna Rao

[Gives two case studies in reference service. Lists the chief reference books in Telugu language.]

“Take my hand;
For I have passed this way,
And know the truth”.

1 Training the Student

Reference Service, as significantly defined by Dr. Ranganathan, is a process of establishing contact between reader and book. It is necessary to train each student about

1 The general make-up of a dictionary, comparison of different Dictionaries, foreign words and phrases, names of persons and places, abbreviations and such other unexpected extraneous information ;

2 Encyclopaedias—their date and exhaustiveness and limitations ;

3 'Who was Who' and 'Bibliographical Dictionary'—dealing only with dead people and 'Who is Who' dealing only of people living. Students are often at sea regarding the reference materials to be looked up for a particular piece of information. They also show incompetence in using a reference book, when they are put on it. This difficulty is greater in regard to the Reference Books in Telugu. This is due to:—

1 paucity of them ; 2 little conformity of these two accepted standards in regard to information included and the arrangement of entries ; and 3 Lack of opportunity to use them in libraries.

2 Fatal Ring Anecdote

Sometimes people hear the name of an author of the title or the contents of a book and want information about it. Once, a lecturer came for information about the "fatal ring". He could not furnish any more details regarding the subject, author or title of the book referred to. But somehow it struck me that the word 'ring' might refer to the ring of Dushyanta or the Ring of Rakshasa. Since the topic given was in English, I referred to the list of translations in the Cambridge Bibliography of Literature and found out the following information

for him, "the fatal ring or Sacontala—an Indian drama translated from the original sanskrit and prakrit by Jones, Sir William, and first published in 1789 at Calcutta and reprinted in 1902."

3 Animals in the Ramayana

Long range reference service requires prolonged investigation. This is all the more necessary when a reader wants to know something about a recent discovery or investigation or of something out of the way. One of the lecturers wanted information regarding the nature, number and names of the animals referred to in the *Ramayana*. He searched the Sanskrit, Telugu and Hindi books on the *Ramayana*, but could not gather all the information required. After a fruitless search through classical dictionaries, we located it in the *Indian historical quarterly*, 18, No. 2 and 3, under the title *Concordance to the fauna in the Ramayana*.

4 Reference books in Telugu

a BIBLIOGRAPHY

Nageswararao (K.) *Andhra vanjmaya charitra* contains a bibliography of books published in Telugu besides information on Telugu poets. Entries are arranged chronologically.

k GENERAL ENCYCLOPAEDIA

2 *Andhra vijñana sarasvamu* is the first Encyclopaedia attempted in Telugu by Komarraju Venkata Lakshmanarao. But only three volumes were published before the author passed away. Later, Kasinadhuni Nageswararao took up the task. But he too died before completing it. The Encyclopaedia is arranged in alphabetically on the model of the *Encyclopaedia Britannica*.

3 Prasada Bhupaludu, *Andhra Vijnanam* or *Telegu encyclopaedia* covers many subjects of historical, cultural and religious importance. Vedic and Puranic legends, shastras and theories, are critically and scientifically treated. In addition to

alphabetical arrangement, a table of contents (alphabetically arranged) is also provided at the beginning. A special feature of this work is information on Hindu Historical geography. This is based on personal visits to places. Its prose style is remarkable for its literary value.

4 Bapineedu (M). *Andhra sarvasvamu* gives a vivid description of the Telugu country, its natural wealth and resources, the inhabitants and their ambitions and achievements. It also gives statistics and descriptive notes on Andhra Art, Language and Literature and on the various movements in which the Andhras played an active part.

3 YEAR BOOK

5 Telugu Bhasha Samiti (University Buildings, Madras) is planning for the preparation of an Encyclopaedia in Telugu. They propose to do it in Twelve Volumes.

Vol. 1 Biology, Zoology, Botany, and Geology.

- 2 Modern Scientific Medicine (Group I), Indian systems of medicine (Group II).
- 3 Mathematics and Astronomy.
- 4 Physics, Chemistry and Atmospheres.
- 5 (Group I) Engineering, (Group II) Industry.
- 6 (Group I) Agriculture and Forestry, (Group II) Veterinary Science.
- 7 Fine Arts, Languages, Literatures, Education.
- 8 Religion, Philosophy, Psychology & Ethics.
- 9 (Group I) Geography, (Group II) Commerce, (Group III) Economics.
- 10 History and Politics.
- 11 (Group I) Sociology and Anthropology, (Group II) Law and Order, and Defence.
- 12 Telugu Culture, Language, Literature and History.

Alphabetical sequence is abandoned. Systematic sequence is adopted. Each volume will have an index. The last volume will have a comprehensive index for the whole set.

6 Satyanarayana (K.). *Prapancha darsani* is an Indian year book in Telugu, dealing with geographical, social, political and cultural aspects of the country, with a "Who's who" section. It gives information about modern poets and contains an Almanac.

0 LITERATURE

7 Veeresalingam Pantulu (K.), *Telugu kavulu* is about Telugu poets and their works, arranged chronologically.

8 Sriramamurty (G.), *Telugu kavulu jeevita shrutralu* gives a chronological description of the lives of Telugu poets with a general appreciation of their works.

9 Subbarao (V.), *Andhra vanjmaya Charitra* is the first book on the classification of the Telugu Literature.

10 Venkatanarayana Rao (K.) *Andhra vangmeya charitra sangrahamu* divides Telugu authors into different ages mentioning the chief characteristics of each age.

11 Satyanarayanasastri (M.) *Andhra Rachayatalu* deals with modern poets and their achievements.

12 Seshayya (Ch.) *Andhra kavi tarangini* is a series dealing with Telugu poets and their works. The series is not yet complete.

13. *Andhra Sahitya Parishad patrika* is a periodical of the Telugu Academy, published once in two months. This journal contains very valuable articles on Telugu literature, classical works, inscriptions, rhetoric and prosody. It also publishes critical reviews of classical work by eminent scholars, with bibliography of books consulted. Its bound volumes form a good reference material on Telugu literature.

P LINGUISTICS

14 Sitaramacharyulu (B.), *Andhra sabha ratnakaram* is illustrated. It is more descriptive than historical.

15 Syamalasastry (K.) *Andhra vachaspatyam*, 4 V, is based on the model of the *Vachaspatyam* in Sanskrit.

16 Subbayya Sastry (K.), *Suryaraya Andhra nighantuvu*, 4V.

17 *Vavilala nighantuvu* is a student's dictionary.

18 Srinivasarao (V.) *Poorvagadhalachari* is on Hindu mythology.

5 Conclusion

To sum up, we have some material in Telugu for reference service. But there is attempt to add to it.

PAPER 2·7

INFORMATION SERVICE

N. Appathura Ayyar

[Describes the kinds of information sought in a library, the equipment and staff necessary to find information and the need for library co-operation].

1 Introduction

The rapid growth of library idea and the progress in library development, have stressed the fact that a modern library is a central bureau of information for its own city or village community. A library should furnish each and every applicant with the readiest, easiest and surest method of obtaining any information required.

2 Kinds of Information

Efficient information service demands a clear grasp of the information sought by the readers. It may be to know a thing, verify some data, locate a place or get details regarding a

person's life or any specified technical information. The request may be for facts about which there is no disagreement and they may be found in any reliable reference book. It may be to get a correct estimate of something for which books containing opinions of different authorities are required. It may involve not only the reading of the matter already presented but a search for facts from unpublished sources. The information sought for in libraries may also be classified as (1) that which may be supplied from the library, and (2) that which is beyond the libraries' resources.

3 Sources of Information

The first indispensable factor that is necessary for efficient information service is the collection and maintenance of good reference books. The International Documentation Meeting held at Copenhagen in 1952, Unesco's Bibliographical meeting held at Paris in 1952, and other Library Committee meetings and Conferences, are various attempts to help libraries in the evaluation of reference materials. Poole's Index, Cumulative book index, Subject Index of Periodicals and the bibliographies and abstracts prepared by special libraries and organisations are among the important reference guide books.

4 Reference Staff

The next factor that contributes to efficiency of service is competent staff. Even in the smallest libraries there must always be some one available who is capable of understanding requests and of directing them into fruitful channels. The reference library can no longer be manned by unqualified and inexperienced reliefs. The librarian or the information officer in a library on the other hand should have a passion for social service. He should be a book-lover and an erudite and discriminating student, ever ready to help readers. He should not depend upon books alone for his information. He is expected to know all other possible sources for gathering information.

5 Understanding the Question

Giving correct information requires a correct understanding of the implications of the inquiry. Some readers are shy in stating their modest needs when they are confronted with the vast store of information supplied to other readers. Some inquirers are difficult to be diagonalised correctly as to the exact nature of the information required by them. They may be over-confident and the superiority complex in them would make them conceal their exact wants by manifesting their dissatisfaction with the information supplied even though correct answers are given to their queries. Great patience and tact are necessary in dealing with such persons. General conversation for a minute or two may throw some light on their requirement. When the problem is once understood, it is easy to collect the necessary materials.

6 From Outside the Library

However adequate the stock of books and however competent the staff may be, occasions are bound to arise in which either the stock or the staff fail to provide the information required by a reader. Such information could be obtained by correspondence and communication with persons possessing special knowledge rather than from printed sources. Another method is to use the "Unsolved questions" column in library periodicals.

7 Library Co-operation

Inter-library loan and co-ordination will be of help in such case. The Inter-University Board and the Indian Library Association have recommended a practical scheme for this. But little progress has been made. Recently the Librarian of the National Library visited many libraries and discussed with Government authorities with a view to ascertaining the possible ways and means to effect library co-operation. In spite of

these efforts, nothing has yet been realised. International inter-library loan and exchange is being fostered by Unesco.

8 Future of Indian Library Service

India has now begun to wake up from her slumber and run her race, as Dr. Ranganathan puts it, to equal if not excel other modern nations. Many quarrels existing now between races, languages, Governments, etc., could be solved if library movement is able to give the masses correct information. May God give sufficient strength to the library pioneers in India to surmount the obstacles in their way and achieve the ideals sketched in the thirty year Development Plan of Dr. Ranganathan so that the national unity of India may be realised. May the future libraries in India realise in the words of W.C. Berwick Sayers that there can be few callings to which a man may be more devoted, from which he gets more joy and in which his interest is sustained and inspired by the truth that "all experience is an arch wherethrough looms that untravelled world whose margin fades, for even and for ever when I move".

PAPER 2·8

COLLEGE LIBRARY

A.V. Benjamin

[Gives a few case studies in reference service in a College Library. Lists the oft-used reference books. Describes the famine of reference books in Indian languages. Pleads for their production to make effective the use of Indian languages as medium of instruction].

1 Objective

In a business library the sole objective of Reference Service is often to find the information sought. It is not so in a College Library. Here this is only of secondary importance. The primary object is to train students in the use of reference material.

A student does not often know to enunciate his requirements in exact terms. He often mentions some big subject containing that, which he really needs, as a sub-division. Sometimes he even mentions collateral subjects. It is the duty of the Reference Librarian to correct this fault in a student. This he can do only by hunting for the information along with the student. As they progress, the Librarian and the student will learn to define the requirement in a progressively closer manner. Learning by doing is the only effective method in college reference service. The librarian should have patience and sympathy to move with the student as he learns by doing.

2 Illustrative Actuality

21 EXAMPLE 1, GLACIER

211 First Hit

A student asked for information about 'Glaciers'. He was asked to consult the *Encyclopaedia Britannica*. The article on 'Glaciers' did not answer his needs. It contained some general information on 'Glaciers'. It also described ten famous glaciers of the world. Of his own accord, he then pulled out the 'P' volume. He soon showed signs of disgust. He was about to leave. The librarian felt unhappy over it. It flashed to his mind. "This boy is the Secretary of the Hiking Club. Evidently he plans to hike to a glacier in the Himalayas." A direct question elicited 'Pindri Glacier' as his objective.

212 Pursuit of the Specific Question

Readers reference atlas of the world was consulted. It gave no information. It did not even mention this Glacier.

Hammonds illustrated library world atlas was equally disappointing. It gave details only for U.S.A.

The librarian took this opportunity to explain to him, how the so-called general atlases were really biased to their countries of origin. This remark made the student ask for an

atlas produced in India. But no elaborate atlas has been produced by the publishing trade in India.

213 A Bye-Product

The young man with all the pulsation of a child of the new-born Republic of India took this seriously to heart. It is a part of the duty of the reference librarian in a college library—though an incidental one—to induce impulses of the right sort in the youth of the country. This is a desirable bye-product.

214 Information Got

When the student was in this mood of reflection, the Librarian put before him the *Catalogue of the Survey of India maps* (1952). The student located maps No. 530, 53N and 62B as likely to be useful to him. These maps did give him the exact information needed.

22 EXAMPLE 2, BEETHOVEN

Another student sought information on 'Beethoven'. As a first step, the Librarian put him on to the *Encyclopaedia Britannica*. The article on "Beethoven" did not give him the information sought. He next asked for information on works of 'Beethoven'. This made the Librarian ask the student to state exactly what he wanted. '5th Symphony' was what he mentioned after some thinking. He was turned on to the *Harvard dictionary of music* and the *Oxford companion to music*. The first book had no entry under Beethoven. The student was disappointed. He was asked to look up under 'Symphony'. That gave him some satisfaction.

The other book gave full information on what he wanted. It was found under "Beethoven" itself. In this process he not only got his information but also learnt to work his way through reference books.

3 Oft-used Reference Books

The following is a select list of a minimum number of reference books needed in a college library.

K GENERAL ENCYCLOPAEDIA

- 1 Encyclopaedia Britannica. 24V. 1952
- 2 Chambers Encyclopaedia. 10V. 1950

W WHO'S WHO

- 3 Who's who
- 4 Writer's and artist's year-book

N YEAR-BOOK

- 5 Statesman's year-book
- 6 Indian and Pakistan year-book and who's who.

M MUSIC

- 7 Harvard dictionary of music

O ENGLISH LITERATURE

- 8 Oxford companion to English literature
- 9 KUNITZ (S.J.) & Haycraft (H.) eds. Twentieth century authors

P LINGUISTICS

P111 English

- 10 WEBSTER (Noah) New international dictionary of the English Language. 2V.
- 11 MURRAY (J.A.H.) etc. Oxford English dictionary. 13V.
- 12 BHANDARI Twentieth century English-Hindi dictionary.
- 13 PATHAK (R.C.) Ed Bhargava's standard illustrated dictionary of the English Language. Anglo-Hindi edn.
- 14 RAOHU VIRA. Consolidated great English-Indian dictionary of technical terms.
- 15 ABDUL HUQ Standard English-Urdu dictionary.

P15 SANSKRIT

- 16 WILLIAMS (Monier). Sanskrit-English dictionary

P15 HINDI

- 17 PATHAK (R.C.) *Comp Ed.* 2 Bhargava's standard illustrated dictionary of the Hindi Language. Hindi-English edn.

Q RELIGION

- 18 HASTINGS (James). *Ed.* Encyclopedia of religion and ethics. 13V.

SOCIAL SCIENCE

- 19 SELIGMAN (K.A.) *Ed.* Encyclopedia of Social Sciences.

T4 UNIVERSITY

- 20 ASSOCIATION OF THE UNIVERSITIES OF THE BRITISH COMMONWEALTH. Year-book.

U GEOGRAPHY

- 21 HAMMOND's illustrated library world atlas

V HISTORY

- 22 THEIMER (Walter). Encyclopedia of world politics, *ed* by Peter Cambell.

X ECONOMICS

- 23 PALGRAVE (R.H.I.) Dictionary of political economy

4 INCONSISTENCY

1 In *Who's who*, London, General Maharaj Sir Shri Ajit Singhji is entered under "S" as Singhji, (General Maharaj Sir Shri Ajit). But in *Who's who*, India, the same name is entered under A as Ajit Singhji (General Sir Mahara-jadhiraj).

2 Again Sir Bijoy Prasad Singh Roy is given in *Who's who*, London, under "S" as Singh Roy (Sir Bijoy Prasad) while *Who's who*, India, puts it under "R" as Roy (Sir Bijoy Prasad Singh).

3 *Who's who*, London, puts Zaffarullah Khan under "Z". But it puts other Mohamadan names ending with 'Khan' under "K". On the other hand, *Who's who*, India, put Zaffarullah Khan under "K".

4 But both these reference books agree entering St. Nihal Singh as Singh (St. Nihal).

This inconsistency confuses students. Can not this library profession do anything to bring out uniformity in the matter?

5 Famine of reference books on India

Indian students suffer from want of reference books on India. Dictionaries in languages are now the only reference books worth mentioning. Almost all other reference materials come from abroad. Indian literature has no reference book at all—none like Berdce's *Browning encyclopedia*, and *Philip's Dicken's dictionary* on individual authors, and none even collectively. Independent India should produce standard reference books on Indian art, music, literature, philosophy, economics, sociology, etc. This alone will enable students to acquaint themselves with our thought.

6 Indian Languages

The medium of instruction in the colleges and schools of India is soon expected to be Hindi or other Indian Languages. Instruction will be impoverished unless reference books are produced in these languages. We need a standard Encyclopaedia in Hindi and in each of the other Indian languages. Publication of standard atlases in Hindi and other Indian languages is equally essential. Other forms of reference materials, such as *Who's who*, Biographical dictionary, Directory, Year-book, Concordance, Gazetteer and Bibliography should also be soon produced in Indian languages.

PAPER 2·9

TRADE UNION COLLEGE LIBRARY

H.D. Sharma

(Gives a pen-picture of the library work being organised in the Asian Trade Union College recently established as the first of its kind in Calcutta. Describes the group and the individual initiation of adult participants in the use of the library. Gives an account of the intimate of the integration of library service with class-room work, and of several extension-techniques in use).

1 Introduction

Reference Service is the process of establishing contact between reader and book in a personal way.

But the books are not the same in all libraries. They differ widely in their form, standard, extension and intention. Nor are readers all alike. Their purpose and needs differ. It follows that reference service cannot be of the same nature in all libraries. It should vary in conformity with the nature of readers and books. It should be more like a prescription than a patent medicine, varying as and when the need for a change arises. So, for a Reference Librarian, the exact knowledge of the readers and the books in his library is of paramount importance. He should study their needs and requirements and then devise means to satisfy them according to the existing circumstances.

A Trade union College Library has its own peculiarities both with regard to Reading Materials and to Readers.

2 Reading Materials

About 90% of the books are on Labour Problems. Subjects like Psychology, Geography, History, Political Science and Sociology are represented but very meagerly—only those books are there which present a bare outline of the subject. Most of the books fall under Economics. This is all as it should be in a Trade Union College Library.

It follows that the work of the Reference Librarian is quite restricted. He need not possess an encyclopaedic knowledge like a University Librarian or a librarian of a Public Library. He need not know 'something of everything'. On the other hand he must know 'everything of something'—of Labour Problems. Again there are not many books on the subject. Especially regarding Asian countries, the dearth of books on each and every aspect of labour problem is keenly felt. And it becomes the responsibility of the Librarian to fill that gap. Even Reference Books are few. But there are always books of greater extension which deal with our subject at some length. More often than not, this is the case. It follows that the Librarian should know the inside of each book thoroughly well. The same is the case with reference books. A careful study of them is possible, as they are not too many nor of too wide a range. In addition they should be supplemented with periodicals. Often the latest information is sought. Hence, the help which periodicals can provide cannot be over-emphasized. Important articles should be selected, classified and listed so as to serve as a Ready Reference Source.

3 Readers

All our participants are adults, with mature mind and considerable experience. They have come with a purpose. Study is not a pastime but a serious affair with them. They have come for a short time only—three months. Generally speaking, they do not have high academic qualifications. Seldom have they visited a modern library. And how many modern libraries are there in Asia? They are not in the habit of reading. They are not at home with a book—much less with a reference book. Their number is small. Their needs are defined and alike. It is a small homogeneous group of twenty to thirty participants. Librarian can and does know each of them personally. He knows too what is going on in the class. He can therefore anticipate what the participants will need and when.

4 Initiation

This is in short the background with which the Librarian of a Trade Union College Library works. The session starts. Work begins. The first step which the librarian takes is the initiation of the participants in the use of the library. There are two ways of doing this. Both are adopted.

41 GROUP-INITIATION

First is group-initiation. This is possible in a Trade Union College Library, because the librarian has free access to the class room. On the very first day, he takes up the class. He explains to the students the nature of the books in the library, their arrangement, something about catalogue, circulation method, rules of the library and so on.

42 INDIVIDUAL INITIATION

Then, students begin to come into the library. He watches their movements—where they go, what they do. He is on the look-out for a proper time to lend a helping hand. He takes one or two participants at a time and initiates them in the use of the library, individually. He spends three or four days in initiating all the students by turn. This is the first step taken.

43 TRAINING IN USING BOOKS

He watches the reaction. After a few days he takes one more class. He carries some Reference Books like Encyclopaedia and Year Book to the class. He demonstrates how to consult a reference book. He makes the participants familiar with what information a particular reference book provides. In an academic library our main purpose should be educating the students in the use of books. It should become a part of the curriculum—an essential part.

5 Preparing Bibliography

The librarian is in touch with the members of the teaching staff. He finds out before-hand what is going to be taught in

the class in the coming week. He prepares a Bibliography on each new subject. This bibliography includes entries in reference books, parts of ordinary books and articles in periodicals. It is in fact a Micro-Bibliography. It is cyclostyled and distributed among the participants and the staff before the lecture begins.

6 Display

"But will they come in search of those materials?" A doubt arises. But why take risk? The librarian displays all the reading materials mentioned in the bibliography in one side of the class room. Proper guides are kept inside them. A catchy title is put in front. The chances of getting a reader for those books are surely far greater now than if they were on the shelves.

Apart from the regular lectures there come some casual visitor-lecturers at short notice. The librarian is on the alert. If the time does not permit to prepare a complete bibliography he merely takes out some books on that particular subject and displays in the lecture hall. At least some interest is created in that subject after the delivery of the lecture.

7 Publicity through Art

Here is another way in which the librarian can attract readers and make them understand some difficult topics. He prepares some diagrams and charts in an artistic manner which are relevant to the lectures going on in the class.

Here is an actual example. The economics professor had to deliver a lecture on 'Money'. The participants felt it to be too subtle and involved. It is a vast subject. A chart was prepared—a big chart—showing the circulation of money in the form of the circulatory system of a human body. In the morning, the librarian was present in the class with his chart. He was attentively listening to the lecture. As soon as the professor

reached the right stage he stood up and showed that chart to the class. The professor explained it to the class. The librarian helped him wherever necessary. The whole thing became interesting and clear to the class in five minutes. The professor was pleased. His time was saved. The students too were happy. They had understood a difficult thing without difficulty. They were so much interested in the Chart that almost all of them copied it down after the class. And happily the number of students who came to borrow books on Money far exceeded those for other topics. Examples can be multiplied.

The cynic may say that this kind of work does not fall within the jurisdiction of librarian's work. But he must know that there is no limit to the work a librarian can do and the help he can give to readers not only in finding out proper books but also to make them friends of the books. This is the message of the Five Laws.

8 Group-Study

A still another field open to the librarian is to help Group-Study-Work.

Study-Groups are formed. Subjects are divided into zones. These are distributed among the members. Each group has to write an article touching a specified aspect of Trade Unionism. The group does it co-operatively, each contributing on his own zone. Students are not accustomed to it. They do not know how to write something new. Librarian lends his helping hand. He works with them. He collects all possible materials for them. He helps them to read and then to write. Still they won't. He himself writes something for them. Then he withdraws his help. This goes on for some time. He is carefully watching the progress of the group. Speed slackens. He gives a push again. And so on. The rusty wheels get oiled. And some time they can move without any help or with minor help at any rate.

These are some of the methods that can be successfully employed in any Trade Union College Library.

81 STIMULATION OF SELF-HELP

But there is always one danger. Too much spoon-feeding will spoil their habit. Students will lack initiative and self-exertion. We should not forget that it is a college library. Like any other academic library its main function is to educate the readers in the use of books. It functions as a laboratory in which the art of fact-finding is learnt by actual practice. Stimulation of self-help is of the very essence of libraries of this kind. Hence the librarian should not only know how and when to lend help, but also how and when to withdraw that help.

82 OPT-USED REFERENCE BOOKS

Σ *Social Science*

- 1 Encyclopaedia of the social sciences

T3 *Adult Education*

- 2 Directory of adult education (Indian Adult Education Association, Delhi.)

VIN4 *United Nations*

- 3 Every man's United Nations (UNO, New York)

X *Economics*

- 4 Dictionary of economic terms Edn 3

X.3 *Great Britain*

- 5 Economic almanac (National Industrial Conference Board)

X.73 *USA*

- 6 Labour fact book (labour Research Association, New York)

X:9 *Labour*

- 7 Dictionary of labour economics (Public Affairs Press)

- 8 Labour dictionary (Philosophical library)

X:9.1 *World*

- 9 Year book of labour statistics (ILO)

- 10 International labour code (ILO)
X:9.2 *India*
- 11 Indian labour year book (Government of India)
X:9:21 *Madras*
- 12 Factories and labour manual (Madras Law Journal
Office, Madras 4)
X:9.2Q7 *Pakistan*
- 13 Pakistan labour year book
X:9.4 *Asia*
- 14 Asian labour laws (ILO)
X:9.73 *USA*
- 15 American labour year book (Labour Research Department,
Rand School, New York)
- 16 Who's who in labour (Dryden Press, New York)
- 17 Dictionary of labour law term (Commerce Clearing House,
New York)
X:9:2 *Labour Relation*
- 18 Directory of employers associations, trade unions, joint
organisations etc. (Her Majesty's Stationery Office)
- 19 Industrial relations handbook (Dartnell Corporation,
Chicago)
X:9:3 *Social Security*
- 20 Social security year book (Social Security Board, Govt.
Printing Office, Washington)
XM *Co-operation*
- 21 International directory of co-operative organisations (ILO)

PAPER 2-10

Standards Library**G.L. Gulati and Sobi Singh**

[Describes the library of the Indian Standards Institution. Gives case studies in reference service. Enumerates the chief reference materials in frequent use. Gives a tabular statement of the standard Institutions of different countries and their publications].

1 Standards Organisation

In recent years with the rapid development of industries the value of recognised standard specifications which lay down rules as to the quality or size or shape of industrial products has greatly increased and it has led to the creation of standardising bodies all over the world. The last thirty years have seen considerable progress in this field. Thirty six important countries of the world have established their National Standards Organizations. The role of standardization in the international sphere has led to the creation of ISO. Besides these many individual industrial organizations and associations have also established their standards departments.

2 Collection

For collection and dissemination of information and data on standards and standardization in the country, the Indian Standards Institution (ISI) is maintaining an up-to-date library. To make its service to the industry and trade of the country, the library has collected standard specifications and their drawings, monographs, reprints, pamphlets, periodicals and other related documents numbering about 35,000 from over 100 organizations comprising international, national, governmental, industrial and professional standardizing bodies, in 18 different national languages of the world. Besides these the library has also a collection of over 2,000 standard reference books and Government Reports in all branches of science and technology.

3 Clientele

The Clientele of a standards library is generally of four types of specialists, the industry, the officer of the Institution, various government departments and other domestic and foreign standardizing bodies. The specialists representing the country's divergent interests of trade, commerce, industry, technology and Government Departments, work on drafting and formulating new specifications and revising and improving upon the

existing ones. There are about 3,000 such members working on various technical committees of ISI. The industrialists and manufacturers are interested in the codes of practices, specifications of quality and material, test methods and simplified procedure for manufacture and improvement of their products. Besides the officers of the Institution the other clientele are generally spread all over the country. This means that demand and queries of the clientele are met mostly through correspondence.

31 ENUNCIATION OF REQUIREMENT

In a standards library a reader demands standard specifications (or documents) either by standard number or by subject. The document number generally indicates the name of the issuing body and the country of origin as well. Experience shows that demand by number is more popular than by subject. Therefore the most useful way of meeting such a demand is to arrange standard specifications by number. The subject approach of the reader confronts the librarian with some difficulties, especially when the demand is particularly confused and vague and has to be clarified before it can be intelligently answered.

Examples

1 Please send all standard specifications on Bobbins, Shuttles, Pickers, Ropes, Bandings and Tapes, Cotton Healds and Reeds, Woollen Goods, Textile Leather Goods, Wire Healds, Wooden Articles, etc.,

2 Please send me a list of specifications on standard methods of tests of concrete.

To meet the enquiry of the latter reader a comprehensive bibliography on the subject was prepared and sent to him. He asked for certain specifications from the list which were lent to him. On examining them he returned them with a note that his purpose was not served and

he asked specifications on cement. When all specifications on cement were sent to him he was still unsatisfied and then he wrote that he wanted specifications on Hydraulic cement only. They were supplied though actually he wanted specifications for methods of test for chemical resistance of Hydraulic cement. Here was his subject. We immediately looked it through indices of publications of American Cement Association, Building Institute of U.K. and American Society for Testing Materials and in the last we found C 267 which served his purpose. To meet such demands of the readers, the library has to make a vigorous search in standards which are of greater extension than the subject of the reader. This leads him to the region of long range reference service.

32 SPECIFIC QUESTIONS

If the enquiry is only of great extension and of specific nature, it can easily be satisfied with the help of our catalogue, Year Books and Handbooks of different standardizing organizations.

EXAMPLES

1 Is there a national standard for zinc chloride for wood preservation in any country ?

2 Have you the Japanese Standard Specification for valve tube for bicycles ?

3 What is the standard method of test for compressive strength of concrete using portions of beams broken in flexure ?

4 What is the standard nominal diameter of solid copper wires used as electrical conductors ?

5 What is the percentage of starch in sizing materials for textiles.

These are met by consulting the catalogues, handbooks, yearbooks and indices of various International, national, Governmental and Industrial Standardising agencies.

We not only furnish him with the information and data about the possessions of the library but also of standards that the library does not hold but have been drafted or formulated on the subject by any Indian or foreign body.

4 Arrangement of Publications

The entire collection in the ISI Library has been arranged as 6 sequences—standard specifications, reference and technical books, Government reports, periodical publications, pamphlets and reprints. These collections have been enumerated in the order of their demand. Standard Specifications have been arranged in the first instance countrywise and under a country in the following order:

- 1 National Standards
- 2 Specifications issued by the Government Departments in the alphabetical order of such departments.
- 3 Standards of other organizations in the alphabetic order of the names of agencies.

Standards of an organization have been arranged in the order of their specific numbers allotted to them by the issuing body.

5 Some difficult cases

51 LEATHERITE INCIDENT

A reader demanded specifications on leatherite. As it was a new word, Webster's and Oxford Dictionaries were consulted. The word could not be found in them. Then Chamber's Technical Dictionary was consulted and the word was not found there too. Thereafter a vigorous search was made in the *Encyclopaedia britannica*, *Encyclopaedia of chemical technology* and *Engineering materials* by White and Judge. But the word was not found. The Librarian approached the reader and asked him what leatherite was and where it was used. The

reader himself could not explain but told him to search it under upholstery materials. A bibliography of standards and other literature on upholstery material was made. But still the word leatherite could not be traced. Personal approach was made by the librarian to experts and light came when an expert said that leatherite was a trade name of leather paper used in making seats of motor cars and the like.

52 STARCH INCIDENT

Another reader asked the librarian to provide him with standard specifications and other literature on percentage of starch in sizing materials and in textile finishing and it was wanted very urgently. A vigorous search was made. The reference tools, standard technical books and specifications on textile finishing were consulted. As no correct answer to the query could be found, it was referred to some experts in textile chemistry, and textile and standards library in the country and abroad.

53 FERRIC ALUM INCIDENT

The Chairman of the Sub-committee on Fertilizers wanted to know if methods of test for basicity content has been prescribed in any foreign specifications on Ferric Alum. The Bibliographies on fertilizers sulphates and Alums and the library catalogues along with other reference tools given in Appendices A and B were consulted and only a Japanese Specification could be traced on the subject. But it was written in Japanese and the reader did not know the language. The library had to approach the Japanese Embassy to get it translated into English. But it did not contain the required test and so is still under investigation.

54 ASBESTOS INCIDENT

The manager, Government Housing Factory asked for standards on asbestos Fibre. The catalogues of national standards bodies were consulted but none of them had

standardized the system of grading Asbestos Fibre. The books on engineering materials by Judge and White were consulted. But they only gave general information on the subject. Then was referred to U.S. Department of Commerce, National Bureau of Standards Miscellaneous Publication No. 110, Standards and specifications for Non-metallic Minerals and their products. But it gave only test methods and general requirements of Asbestos Yarn. But the reader wanted grading of raw Asbestos Fibre. Then we turned to the *Encyclopaedia of chemical technology* published by Inter-science Encyclopaedia, Inc., New York. This gave valuable information and also the classification of Asbestos Fibre referred to. We also learned from this that this system of classification had been introduced and approved by the Quebec Asbestos Producers Association, Canada, which is an authority on this subject. We approached that body and collected full information.

6 Reference Material

6.1 SELECT BIBLIOGRAPHY ON STANDARDIZATION

(The following bibliography comprises references to books on general subject of standardization)

AMERICAN STANDARDS ASSOCIATION. What Good are Standards 1949. New York. pp. 47.

AMERICAN STANDARDS ASSOCIATION. Standards—Spearhead of industrial Mobilization. 1951. New York. Pp. 51.

ANGLO-AMERICAN COUNCIL OF PRODUCTIVITY—Simplification in Industry made by a group appointed by the Council. 1949. pp. 12.

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6.2 CATALOGUES OF STANDARDIZING BODIES

In tracing out whether a standard specification on a particular subject or commodity has been issued by a particular standardizing body, its catalogue or list of publications is very helpful. A list of such catalogues available in the ISI Library is given below.

Country	Standardizing Body	Title	Frequency	Arrangement	Approximate No. of Standards	Special features
1	2	3	4	5	6	7
<i>Note:</i> In column 4 a = annual, h = half-yearly, i = irregular, m = monthly, q = quarterly In column 5 a = alphabetic, c = classified, n = numerical order, s = serial.						
Australia	Standards Association of Australia	(1) Hand book (2) List	i	s	300	(1) Index of test methods (2) Alphabetical Index
Austria	Osterreichischer Normenausschuss	Verzeichniss der Normen	—	s		
Belgium	Institut Belge de Normalisation	Catalogue	i	n	300	Classified index (UDC) including abstracts. Bilingual (French and Flemish).
Canada	(1) Canadian Government Specifications Board	List		s	300	Price
	(2) Canadian Standards Association	List	a	s	500	Price
Denmark	Dansk Standardiseringsrad	Fortegnelse Over DS Blade	i	c	400	(1) Illustrated. 2) Price

1	2	3	4	5	6	7
France	Association Francaise de Normalisation	Catalogue	a	s	3,000	(1) Price (2) Standardization History and Procedure (3) Note on ISO (4) Monthly Supplements
Germany	(1) Deutscher Normenausschuss (2) Verband Deutscher Elektrotechniker Magyar Szabványügyi Intézet	(1) Normblatt Verzeichnisse (2) List Szabvány jegyzék	a i i	c c c	8,000 200 2,000	(1) Numerical List (2) Alphabetic List (1) Alphabetical Index to UDG numbers
Hungary	(1) Indian Standards Institution (2) Ministry of Defence	Handbook (a) Index Drawings for general stores (b) Index Specification tions & Drawings for general stores	a i i	n n a	400	Alphabetic and classified index
India	(3) Ministry of Works, Housing & Supply	List No. 38 of DGI/ISD/DGS & D/General Specifications	i	s		
	(4) Ministry of Railways	List of IRSBS, ISI DGS&D and ISD Specifications adopted for use on Indian Railways	i	s		Alphabetic index
Ireland	Institute for Industrial Research and Standards	Information Sheet	q	n	50	Drafts included

1	2	3	4	5	6	7
Israel	Standards Institution of Israel	Bulletin	m	n	50	
Italy	Uni Ente Nazionale Italiano de Unificazione	Elenco Delle Pubblicazioni	a	c	4,000	(1) Price (2) Numerical Index
Japan	Japanese Industrial Standards Committee	List	h	s		
Mexico	Direccion General de Normas				200	
Netherlands	Hoofdkommissie voor de Normalisatie Nederland	Catalogue	i	c	1,000	(1) Numerical Index (2) List of ISA Bulletins & TEC Publications with their prices (3) Alphabetic Index
New Zealand	New Zealand Standards Institute	List	i	n	200	Government Purchase Specifications and emergency standards in numerical order. Alphabetic index.
Norway	Norges Standardiserings-Forbund	Fortegnelse Over	i	c	300	
Poland	Polske Komitet Normalizacyjny	Katalog Polskich Norm	i	n	3,000	Alphabetic Index
Roumania	Comisiunea de Standardizare	Indicatorul	i	n	2,000	
South Africa	South African Bureau of Standards	Bulletin	m	a	300	
Spain	Instituto Nacional de Racionalizacion del Trabajo	Catalogo	i	n	500	

1	2	3	4	5	6	7
Sweden	Sveriges Standardiseringskommission	Swedish Standards	i	c	500	(1) Numerical Index (2) Qly. Suppl.
Switzerland	Association Suisse de Normalisation	Repertoire des Normes	i	s	300	
USA	(1) American Standards Association	List	h	s	1,000	Alphabetic Index
	(2) American Society for Testing Materials	Index	a	al	2,300	Numerical List
	(3) American Society for Testing Materials	Fifty Years Index	i	a	(1) Subject Index (2) Author Index of all articles published in ASTM Bulletin from 1898 to 1950. List of special technical publications and symposia.	
	(4) Army	Index of Specifications (including NME (JAN) Standards)	a	al	11,000	Numerical Index
	(5) Federal Administration	Federal Specifications Index	a	a	1,900	Numerical Index
	(6) US National Bureau of Standards	Publications of NBS 1901 to June 1947	i	n	(1) Subject Index (2) Author Index	
USSR	GOST All Union Standards Committee	Catalogue	i	s		Subject Index

1	2	3	4	5	6	7
UK	(1) British Standards Institution	Yearbook with a monthly information sheet	a	n	2,000	(1) Abstracts (2) Pages and price (3) Working of the Institution and various administrative & technical Committees and their personnel. (4) Institutions where BS are available for reference or sale. (5) List of New Specifications and amendments during the year. (6) Specifications withdrawn or revised during the year. (7) List of standards under revision and preparation. (8) Aircraft materials specifications, STA specifications and codes of practices.
	(2) Ministry of Supply	List of Aircraft Material spec. DTD Series				Price

6.3 MANUALS OF SPECIFICATIONS

D ENGINEERING

D:32 Strength of Material

ASTM book of standards. 1952. 7 V. American Society for Testing Materials. Philadelphia.

Triennial with annual supplements. Volume index. Cumulative index.

1650 standard specifications and tests for engineering and related materials.

D1 Building Material

BRITISH STANDARDS INSTITUTION, London. Standards for building materials and components for housing. (Handbook, 3). 1950. P 722 Rs. 25/-

It is a collection of 279 standards on architecture building trade.

RAMSEY (C.G.) and SLEEPER (H.R.). Architectural graphic standards. Edn 4. 1951. P 614. Rs. 45/-. New York. John Wiley and Sons.

Nearly 12,000 drawings. Lucid index of 48 pages.

TRATMAN, EDWARD ERNEST RUSSELL. Specifications and standards for public works engineering; abstracts of more than 100 specifications for materials and construction. Supplemented by standard rules and regulations. New York, McGraw Hill publishing company, inc., 1938. Pp. 180 illus.

D1:9 Ventilation etc.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS. Heating, ventilating, air conditioning guide. Ed 27. 1949. P 1384. New York.

D416 Bridge

BRITISH STANDARDS INSTITUTION, London. Standards for design and construction of girder bridges. (Handbook, 7).

D513 Motor Vehicle

BRITISH STANDARDS INSTITUTION, London. Standards for the automobile industry. (Handbook, 8). 1950. P 514. 21/-.

SAE Society of Automotive Engineers. Handbook. 1952. Pp 864. \$ 10.00. New York. Annual.

2,000 specifications including tractors, earth moving and marine equipments.

D515 Railway

AMERICAN RAILWAY ENGINEERING ASSOCIATION. Manual. 2V. Pp 1600.

Loose leaf specifications recommended. Recommended practice for railway engineering in 29 chap. Alp Index.

D6 MECHANICAL ENGINEERING

D6:71 Lift

BRITISH STANDARDS INSTITUTION, London. Standards for lifting tackles. (Handbook, 4). 1946. Pp 362. 12/6.

Collections of standards for fibre ropes, wire ropes, chain, terminal fittings and other attachments for lifting.

D6:8 Workshop

BRITISH STANDARDS INSTITUTION, London. Standards for Workshop practices. (Handbook 2). 1946. Pp 483.

275 tables. 300 drawings. 12/6.

D66 Electrical Engineering

INTERNATIONAL ELECTRO-TECHNICAL COMMISSION. Recommendations and specifications.

Covers 38 branches of electrical engineering.

D66:9M3 Domestic Installation

BRITISH STANDARDS INSTITUTION, London. Standards for domestic electric installations 1950. (Handbook, 9), 1949. 12/6.

D856 Water Work

BRITISH STANDARDS INSTITUTION, London. Standards for water fittings. (Handbook, 12). 1950. Pp 580. 25/-.

F TECHNOLOGY

F11 Laboratory Chemicals

ANALAR standards for laboratory chemicals Ed 4. 1949 Pp 302. £0-10-6. British Drug Houses Ltd. and Hopkin and Williams Ltd., London.

Specifications and test methods for 300 chemicals and analytical reagents. Alphabetical by subject. Index.

REAGENT Chemicals: American Chemical Society Specifications. Washington. 1950. Pp 13 400.

ROSIN (J). Reagent chemicals and standards. Edn 2. 1946. Pp 542. New York. D. Van Nostrand Co.

Volumetric solutions and tables of their equivalents, equivalents of normal and tenth-normal solutions; Determination of Freezing point, nitrogen, sulphur, water and pH; Buffer solutions; Buffer mixtures and the alphabetic index.

F1825 Steel

BRITISH STANDARDS INSTITUTION, London. Standards for steel and steel products. (Handbook, 10), 1949. Pp 674. 25/-.

British Standards Institution, London. Standards for steels for railway use (In Spanish only). Handbook 6. 1948.

F191 Metal

AMERICAN SOCIETY OF METALS. Metals handbook. 1943. Pp 1444.

Irregular. 4 sections—General, Ferrous, Metals. Non-ferrous Metals and Constitution of alloys. Specifications, tests and methods of procedure. Index Government specification numbers for non-ferrous metals and alloys.

BRITISH STANDARDS INSTITUTION, London. Mechanical tests for metals. (Handbook, 13), 1951. Pp 243. 17/6.

CANADA, DEPT. OF NATIONAL DEFENCE. Catalogue of ferrous alloy specifications, commercial and service, 1949 Pp. 932. \$ 12.00.

F55 Fuel

BRITISH STANDARDS INSTITUTION, London. Standard for domestic fuel and power-using appliances. (Handbook, 5), 1948. Pp 160. 12/6.

F554 Tar

STANDARDIZATION OF TAR PRODUCTS TESTS COMMITTEE. Standard method of testing tar and its products. Edn 3. 1950. Pp 470. Sh. 30/-. London.

F555 Petroleum

INSTITUTE OF PETROLEUM. Standard methods of testing petroleum and its products. Edn 12. 1952. Pp 22 727. London.

Alphabetical and numerical lists of methods precede text. Reports of committees. Alphabetical subject index.

H7195 Non-Metallic Mineral

STANDARDS and specifications for non-metallic minerals and their products. U.S. Department of Commerce. Miscellaneous Pub., 110, 1930. Pp 680. \$ 2.75.

Summary of standard specifications, simplifications and testing methods by the US Federal Supply Board and non-governmental bodies (list given). Out of date.

J37:8 Fruit Canning

MANUAL of specifications for canned fruits and vegetables. American Hospital Association. 1950. Pp 131. Chicago
Cans for 30 canned fruits and 29 canned vegetables.

J38 Grain

U.S. AGRICULTURE (**Department of—**). Handbook of official grain standards of the United States. 1951. Pp 2+102. \$ 0.25. Washington.

Features of grain inspection. No index.

M OTHER COMMODITIES

ISA (=International Organisation for Standardisation) Bulletins. 32 in number. Specifications on different subjects.

US Department of Commerce, National Bureau of Standards. National Directory of Commodity specification. Misc. Pub M178. Washington. 1945. Pp. 1311. \$4.00 Supplement 1947. Pp. 322. \$2.25.

Summary of standard specifications and methods of tests for commodities in general use. Classified. Index of trade names. Addresses of holders of originals. Needs revision.

M6 Clothing

BRITISH STANDARDS INSTITUTION, London. Buyer's guide to British Standard size fittings for women's and children's clothing. (Handbook, 14.), 1950. Pp 55. 6/-.

MJ Textile

BRITISH STANDARDS INSTITUTION, London. Methods of test for textiles. (Handbook, 11). 1949. Pp 312. 21/-.

X: 2 Commodities

National Directory of Commodity Specifications. US Department of Commerce, National Bureau of Standards Misc Publication M 178, 1945 1311 p. Supplement 1947 322 p. 45 Govt. Printing Office.

6-4 PERIODICALS

The periodical publications of various technical bodies form a very useful reference source. It is here that the latest development and nascent thought are to be located. The journals of almost all the technical bodies have articles on standardization in their specific field. Besides there are 32 periodicals which are exclusively devoted to the subject of standardization. Seventeen of them have come into being during the last six years. These are mostly the organs of national standardizing bodies in various countries. They are in the national language of the issuing country and therefore the

documentation work is very difficult. There is a need for an abstracting periodical in the subject. Such a work could best be taken up by ISO (International Organization for Standardization) and may be issued in one or more international languages.

PAPER 2.11

MILITARY CHEMISTRY**K.S. Parthasarathy**

[Gives 4 case-studies of reference service in a library specialising in Military Chemistry. Gives a list of 18 oft-used reference materials.]

1 Introduction

Prompt documentation service is of the very essence of work in a Library of Military Chemistry. Reference books and abstracting periodicals form the backbone. A reference file should also be built up in the light of day-to-day experience, to supplement printed information.

2 Arabian Sea Incident

The depth of the Arabian Sea in a particular spot somewhere south of Bombay was urgently needed. Hammond's and Bartholomeo's atlases proved unhelpful. Whitaker's Alamanack gave only the greatest depth in the Indian Ocean. P 34 of part I *Physical geography of Modern geography* by S.E. Thomas, gave the technical term 'Isobath' for a line passing through all places of same depth. The maps in edn 14 of *Encyclopaedia Britannica* generally contained Isobath Lines. But the map for India did not give them. Working backwards, the map in edn 10 of the same encyclopaedia was found to give the necessary information.

3 Explosion Incident

Details of the "Great Explosion in a ship somewhere near Nova Scotia sometime after 1917" were wanted. Search under 'Explosion', 'Ship', and 'Ship-wreck' and 'Naviga-

tion' in the *Encyclopaedia Britannica* proved fruitless. *Reference catalogue of current literature* also proved unhelpful. The enquirer was asked to state the purpose for which he wanted the information. But it was said to be confidential. This led to the conjecture that the explosion must have occurred in a man of war or in an ammunition ship. A search among the books kept in the "secret collection" led to the book *History of explosions* (Privately printed). This gave all the details.

4 TNT Incident

Effect of sunlight on TNT (=Trinitro-tolure) was urgently required. This was an important problem in storage. Books on organic chemistry did not throw light on this question. V 4 of edn 4 of the *Dictionary of applied chemistry* gave a clue. It also gave a good bibliography of articles in a German periodical. This along with abstracts from confidential files, filed under "TNT reaction with other substances, atmosphere etc." gave all the required information.

5 Overburnt-lime incident

The library had no books on lime. Books on the subject were about to be requisitioned from another library. But before that, the volumes of *Annual reports on the progress of applied chemistry* were scanned. Page 185 of V 11 (1926) gave some information. This also led to a search of the pages of Mellor and Thorpe. About 2 pages of typed matter were finally culled from these sources.

6 Reference materials

Here is a list of oft-used reference materials.

Physical Sciences

1 International critical tables of numerical data, physics, chemistry and technology. (National Research Council, U.S.A.) V 8. 1926-1930. Eng., Fr, Germ, and Italian. Bibliography at the end of each topic.

2 Scientific encyclopaedia (Van Nostrand). Edn 2. 1947. Alphabetical cross references Illust and tables. Description of substances and meanings of terms.

Chemistry

3 Chemical abstracts. 1907. Annual and decimal subject and author indexes. Formula index from 1920. Patent index from 1935.

4 Chemisches Zentralblatt. 1830. Quinquennial cumulative index. Formula index from 1925.

5 Kingzett (C.T.) Chemical encyclopaedia. Edn 4. 1928. Dictionary arrangement. Bibliography.

6 Lange (A.N.) Handbook of chemistry. Edn 2. 1937. Systematic contents. Alphabetical index. References to Beilstein.

7 Landolt-Bornstein. Physikacisch-chemische Tabellen. Edn 5. 2V.

8 Gregory (C.T.) Condensed chemical dictionary. Edn 3. 1942. Meanings of terms. Trade names. Essential data about chemicals. Specification for transport of explosives.

9 Hackh (Ingo, W.D.) Chemical dictionary. Edn 3. 1946. Who's who with portraits. Tables and diagrams. Dictionary arrangement. Cross references. List of dangerous chemicals.

10 Mellor (J.W.) Comprehensive treatise on inorganic and theoretical chemistry. 16V. 1922-1937. Index in each volume and a general index. Rich in narrative bibliography.

Analytical Chemistry

11 Scott (W.W.) Standard methods of chemical analysis. Edn 5. 2V 1939. References to American standard for testing materials. Author and subject index.

Organic Chemistry

12 Beilstein. Handbuch der organischen Chemie.

1910—, 29V+25 (suppl) + 5 Index Vols. II series of supplements in progress. Arrangement by system numbers.

Technology

13 Thorpe (J.F.) and Whitney (M.A.). Dictionary of applied chemistry. Edn 4. V 1—10 (in prog.) 1938—. From Vol. VI includes Physico-chemical subjects. List of periodicals in VI. Bibliography. Index for V 1—6, index from V 7 onwards.

14 Bennett (H). Chemical formula. 3 V. 1933-36. Trade names.

15 Gregory (T.C.) Uses and applications of chemicals and related materials. 1939. Alphabetical arrangement by common names. Foreign equivalents given. Patent references given.

16 Perry (J.H.) Chemical engineer's handbook. Edn 2. 1941. In 29 subject-groups. Alphabetical index.

17 Martin (Geoffrey) Industrial and manufacturing chemistry. 3V. Lists of trade names. History of modern explosive chemistry. Bibliography.

18 Spons. Workshop recipes. 1924-1930. 4V+1 supplement.

PAPER 2·12

GEOLOGICAL LIBRARY

G.B. Ghosh

[Stresses the importance of aids to search for geological literature. Lists oft-used reference materials].

1 Introduction

The growing importance of geology and mineral industries of a country in these days of atomic research necessitates acquaintance with the various types of geological reference. This is likely to cover a considerable part of the work of any progressive geologist. The different colleges and universities conducting courses in geology have also increased

interest in geological literature amongst the students and research workers during the last fifteen years. The volume of geological literature is daily increasing although at a slower rate than in other sciences.

2 Guide to Literature

For sound scientific research work, "library-habit" is absolutely essential. Everybody should at least know how to use literature as an instrument of research. R.M. Pearl's *Guide to geologic literature*, 1951, will be of use.

3 Reference Material

The method of conducting search for geological literature depends on various factors. No one method can be adopted to suit all occasions. Accessibility of the literature is being made easier these days with the extension of library facilities for lending, methods of documentary reproduction and translation. It becomes easier if the man who conducts the search familiarises himself with the different types of reference materials both foreign and national available on this subject. A select list is given below:

4 List

Several bibliographical periodicals covering science in general are naturally of value to geologists. The following is a list of bibliographical periodicals in geology only.

Geology

- 1 GSI library bulletin. (Geological Survey of India). Calcutta. 1952—.
- 2 List of geological literature added to the Geological Society's library during the years 1894-1934. London. 1895-1936.
- 3 Bibliografia geologica italiana. (Comitato Geologico). Rome. 1934 (?)—
- 4 Bibliographie des sciences geologiques. (Societe Geologique de France). 1924—.

- 5 Bibliographia geologica. Brussels. 1897-1906.
- 6 Geologisch-mijnbouwkundige bibliografie van Indonesie (Nederlandsch Geologisch-mijnbouwkundig Genootschap). S'Gravenhage. 1927(?)—
- 7 Geologisches Zentralblatt: Anzeiger für Geologie, Petrographie, Paläontologie und verwandte Wissenschaften. Berlin. 1901-1931. *Continued in* Abt A: Geologies 1932—and B: Paläontologie 1932—
- 8 Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. Referate Teil: I, Kristallographie, Mineralogie; II, allgemeine Geologie, Petrographie, Lagerstättenkunde; III, historische und regionale Geologie, Paläontologie. Stuttgart. 1928—
- 9 Revue annuelle de la littérature géologique suédoise. (Geologiske Forening). Stockholm.
- 10 Geology of the U.S.S.R. Bibliographical annual. 1937—
- 11 Bibliographie géologique de la Suisse. (Société Helvétique des Sciences Naturelles). Berne.
- 12 Bibliografia geologica a Romanici. Bucharest. 1934(?)—
- 13 Bibliografia geologiczna Polski. (Państwowy Instytut Geologiczny). Warsaw. 1914—
- 14 Bibliographic contributions (Geological Society of America). New York. 1933-34.
- 15 Bibliography of North American geology. (United States, Geological Survey). Washington. 1785—
- 16 Bibliography and index of geology exclusive of North America. (Geological Society of America). New York. 1935—
- 17 Bibliografia de la geologia, mineralogia y paleontologia de la república Argentina. (Academia Nacional de Ciencias). Cordova.

- 18 Cronica bibliografica: mineralogia y mineria, petrografia geologia, geografia-paleontologia. Instituto de fisiografia y geologia. Santa Fe.

Geophysics

- 19 Geophysical abstracts (Geological Survey, Department of the Interior). Washington. 1929—

Mineralogy

- 20 Mineralogical abstracts. (in Mineralogical magazine). (Mineralogical Society). London. 1895-1936.
- 21 Fortschritte der Mineralogie, Kristallographie und Petrographie. (Deutschen Mineralogischen Gessellschaft). Berlin. 1911-1941. *Continued as* Fortschritte der Mineralogie. Stuttgart. 1942(?)—
- 22 Mineralogicko-geologicka biliografie CSR. (Statni Geologicky Wstav). Prague. 1931 (?)—
- 23 Bibliography of seismology. (Department of Mines, Dominion Observatory). Ottawa. 1929—
- 24 Bulletin bibliographique trimestriel. Section de seismologie: (Union Geodesique Internationale). Brussels. 1924—

Palaeontology

- 25 Fortschritte der Palaeontologie. Berlin. 1935—

Economic Geology

- 26 Annotated bibliography of economic geology. (Society of Economic Geologists). Urbana. 1929—

PAPER 2·13

AGRICULTURAL LIBRARY

N.N. Chatterji

[Gives a few case studies. Lists oft-used bibliographies.]

1 Introduction

For making reference service effective, quick and efficient, the Library of the IARI (Indian Agricultural Research Institute) receives, 19 abstracting and bibliographical periodicals dealing exclusively with agricultural sciences.

— Eight of them are said to cover world-literature on agriculture. But they cover only developed countries. India is not fully covered. To remedy this and also to minimise time-lag, articles on Indian agriculture are indexed in the library.

2 Case Study

Cases occur when efforts have to be made to know what exactly readers want. A reader asked for recent books on "Cotton growing in India." When told that no such books had been published during the last decade, he felt vexed and asked for the latest statistical figures about "Cotton". The recent issues of the *Indian agricultural statistics* failed to satisfy him. Then he asked for literature on "Cotton seeds." It was not difficult to guess what exactly he wanted. The latest reports of the Indian Central Cotton Committee met his needs.

Once a reader successively asked for books on "Geology", "Physical Geography" and finally "Soils of India." Then he enquired if the library had books about "Delhi". After some questions, his subject was found to be "Chemical analysis of Delhi soil." Since he had previously asked for books on geology, it was guessed that he was probably interested in "Mineralogical analysis." A thesis, submitted by a student in 1949 for the Associateship of this Institute, gave him satisfaction.

3 Bibliography

Here is an annotated list of abstracting and bibliographical periodicals in agriculture, received in the IARI Library:—

1 Field crop abstracts (Commonwealth Bureau of Pastures and Field Crops, Abberystwyth). Quarterly. 1941. P 235. Entries 1,250. 620 periodicals from 75 countries are covered. Entries in seven headings; subdivisions arranged

according to UDC, which are not indicated. Alphabetical author and subject index in the last number of each volume.

2 Bibliography of agriculture (US Department of Agriculture, Washington). Monthly. 1941. P 2725. Entries 88,000.

3 Horticultural abstracts (Commonwealth Bureau of Horticultural and Plantation Crops, East Malling), Quarterly. 1931. P 580. Entries 4,150. Covers articles in 15 languages. Entries in 12 subject-groups. Author and subject indexes. Cumulative author and subject indexes for V 1-10 and V 11-15.

4 Herbage abstracts (Commonwealth Bureau of Pastures and Field Crops, Abberystwyth), Quarterly. 1931. P 218. Entries 1, 350. Time-lag of 8 months for V 21, 1951.

5 Horticultural abstracts (Indian Council of Agricultural Research, New Delhi). Monthly. 1951. P 180. Entries 570. Only periodicals in English received in IARI and ICAR libraries are covered. Entries arranged under nine headings.

6 Soils and fertilisers (Commonwealth Bureau of Soil Science, Harpenden). Bi-monthly. 1938. P 500. Entries 2,700. Covers articles in 20 languages. Entries arranged according to UDC. Annual alphabetical and subject index.

7 Bibliography of soil science, fertilizers and agronomy (Commonwealth Bureau of soil science, Harpenden), Quadrennial. 1938. P 535. Entries 6,000. Covers world literature culled from about 1,200 publications. Arrangement according to UDC. Alphabetical author and subject index.

8 Review of applied mycology (Commonwealth Institute of Mycology, Kew). Monthly. 1922. P 650. Entries 1,770. Entries arranged by crops. Alphabetical subject index under a few headings.

9 Review of applied entomology (Commonwealth Institute of Entomology, London) Monthly. 1913. P 730. Entries 1,450. Series A: pests of plants. Series B: pests of animals. Entries grouped under a few main headings. Arrangement alphabetical under countries. An alphabetical subject index to each volume and each series is published separately.

10 Plant breeding abstracts (Commonwealth Bureau of Horticultural and Plantation Crops, East Malling). Quarterly. 1931. P 580. Entries 4,150. Covers articles in 15 languages. Entries in 12 subject-groups. Author and subject indexes. Cumulative author and subject indexes for V 1-10 and V 11-15.

11 Forestry abstracts (Commonwealth Forestry Bureau, Oxford). Quarterly. 1939. P 550. Entries 3,500. Covers articles in 24 languages. Arrangement according to the Oxford Decimal System for Forestry. An 'Alphabetical Index' to this system and a 'Guide to the use of Forestry Abstracts' published. Index published in 4 parts (Author, Subject, Woody species and Geographical) issued together with No. 1 of the succeeding volume.

12 Agricultural and horticultural engineering abstracts. (National Institute of Agricultural Engineering Silsac). Quarterly. 1950. P 330. Entries 1,250. No time-lag. Entries in two parts: Agriculture and Horticulture. Each part has an alphabetical, author and subject index.

The two following abstracts covering a more extensive subject are of much use:—

13 Biological abstracts (University of Pennsylvania, Philadelphia). Monthly. 1926. P 3,200. Entries 30,400. 2,600 periodicals covered. In 9 sections. C to I sections. Entries in 62 subject groups. Annual Index (P 450) includes Systematic index of plants and animals, Geographical index, Geological index and an Alphabetical subject index.

14 Food science abstracts (Department of Scientific and Industrial Research, London). Bi-monthly. 1929. P 675. Entries 2,800. Entries arranged under 12 headings. Annual alphabetical author and subject index.

PAPER 2.14

MEDICAL COLLEGE LIBRARY

A. Neelamegham

[This paper is based on the experience of the Madras Medical College Library. Describes the variety of clientele. Gives some case studies. Describes the grades of reference materials. Gives a list of the chief reference materials in frequent use.]

1 Role of Reference Service

At the International Congress of Medicine of 1881 Dr. John Shaw Billings remarked that for the research worker "...a knowledge of how and where to find the record of a fact is often of more practical use than a knowledge of the fact itself." (British medical journal, 2, 1881, 266). Since then reference works, bibliographical aids and abstracting services, of both macro and micro thought have multiplied by the dozens in the field of medicine and allied sciences. In spite of this, the searcher finds it difficult to lay his fingers at once on the sources that would give him the exact and most complete information on the subject of his interest. He leans more and more on the librarian for bibliographical assistance. The librarian for his part is expected to provide expert reference service based on a survey and study of at least the major part of the source materials, their scope and limitations, peculiarities and inadequacies. This growing dependence of the scientist on reference service has its advantages as well as disadvantages. Too great a dependence might mean the scientist missing some data which the librarian might overlook as being irrelevant to the question. Secondly, the valuable training in literature search would be lost to the research worker. As against this it

is argued that the scientist is not so well acquainted with source materials and techniques of literature search as the librarian. Much valuable time may be lost to the former if he does the library search all by himself. There is also the danger of the novice being lost in the maze of collateral fields. A happy cooperation between the library and the laboratory is essential to save time and energy to all concerned. All the library processes of acquisition, classification, cataloguing and routing are but means to facilitate reference service. Efficiency in this depends (1) on the intelligent approach to each question and the adoption of systematic procedure for literature search, and (2) on the prior organisation of the files, records and indexes. The librarian's study, search and inquisitive spirit can widen the scope of reference service to an almost unlimited extent.

2 Clientele

I shall illustrate from my experience in the library of the Madras Medical College. The library serves not only the students and staff of the College but also the staff of the General Hospital with which the college is intimately associated. Its readers include:

- 1 College students, laboratory technicians and the like. Most of these are unfamiliar with medical literature and terminology.
- 2 House surgeons and post-graduates. Many of these are working on theses and case records. A few are making their first attempts at research. They know the basic texts in the field of medicine. But they are untrained in literature-search and bibliographical technique.
- 3 The teaching staff. A good number of these are medical officers of the hospital. Some do research and publish results. Others direct the research work of juniors. A member of this group is mature.

He knows what he wants. To a certain extent, he may also know where to look for information. Even then, he always appreciates library-cooperation in keeping himself informed of current trends in his field of interest, in the preparation of bibliographies, etc.

- 4 The busy practitioner. He wants information at short notice. He may be on the hospital staff. Or he may be a private practitioner admitted to the privileges of the library. Only the other day a senior surgeon rushed to the library to clear some doubts about a particular operation. He knew exactly where he should look for the information. But unfortunately we did not have that particular volume of the periodicals. He was, however, immediately put on to another source. After the operation, the surgeon phoned to the librarian to say that his timely help saved the life of a patient. Such incidents are not rare. Clinicians come up to verify the correctness of their diagnosis, or to know the exact dosage of such and such medicine in such and such a case.
- 5 A miscellaneous group mostly non-medical men, seeking medical information on occasions: Lawyers, medical representatives, the press and so on. Obviously, all of these are unfamiliar with medical literature and require answers to their questions and not guidance in library-search.

3 Type of Reference Service

To classify roughly the usual sort of reference service done :

- 1 The preparation of comprehensive bibliographies on wider or narrower fields, *e.g.* Cultivation of lymphogranuloma venereum virus ; coronary artery disease ; tumours of the testes.

- 2 Short list of selected references, usually, required by those working on theses and case records (for post-graduate degrees) *e.g.* Accoustic neurofibroma; pyogenic meningitis complicating lung abscess; TEM in Hodgkins disease; radioiodine in thyrotoxicosis.
- 3 Specific information, *e.g.* Date of birth of William Harvey; address of Dr. ; portrait of Banting.
- 4 Initiation of college students and raw graduates in the use of the library and representative reference materials in medicine. This sort of initiation work is common to all types of libraries and is particularly valuable here. To a degree students should be forced to consult books. With the cooperation of the faculty, students and raw graduates should be trained, according to a programme, in library methods, literature-search procedure and bibliographical technique. This will prove beneficial in the long run. Special students and post-graduates specialising in particular fields must be made familiar with the reference works in their special interests.

4 Reference Source

Coming to the sources of information it may be said that any book, pamphlet or periodical may prove a useful source of reference value. Apart from these what we usually designate the following as sources of reference include

- 1 Encyclopaedias, handbooks and dictionaries, which very often provide the basic information to work upon and lead to other sources.
- 2 Annuals, such as year-books, reviews and recent advances series. Along with the summarized information on recent progress in various fields, these give a well-tested select bibliography.

- 3 The vast amount of information contained in periodicals is explored with the aid of periodical indexes and abstracting periodicals. In spotting the word under which the literature on a particular topic may be indexed much imagination may have to be brought into play.
- 4 Directories, biographical dictionaries, address books, atlases etc., very often come in handy.
- 5 Aids to location of sources such as union lists are essential.
- 6 *Ad hoc* bibliographies prepared in various libraries for a group of publications not usually indexed by abstracting and indexing publications. These include theses and trade literature, publications of government departments, societies, institutions etc.

5 Inadequacy of Sources

In spite of all these helpful sources it takes a pretty long time and much ingenuity to find the answer to a question, and here lies the thrill of reference service. To quote just one example, one of the professors approached the library assistant for a portrait of Dr. Banting. The professor had already seen through the books on history of medicine, endocrinology, diabetes, insulin, pancreas etc., available in the library, and none of them gave it. We do not have a portrait index. But we were sure that at least one of the books or periodicals on the shelves must be hiding what we were searching for. However, there was no point in making a wild search. Just then it struck one of us that the firm of Eli Lilly very often advertised their make of insulin and on occasions the advertisements are portraits of discoverers. A rapid perusal of the advertisement pages of a few issues of the *Journal* of the American Medical Association proved fruitful.

The difficulties in preparing comprehensive bibliographies on a topic is not confined to the small collection. Even with the largest collections, it is quite a task to make sure that all references have been noted.

The field of medicine is expanding endlessly and literature on even its minutest sections is accumulating with a rapidity limited only by the power of scientific spirit and imagination. We are handicapped in exploring the vast amount of information and bringing into use, by the absence of comprehensive bibliographies on many sections and sub-sections. The comparatively few published bibliographies have to be brought up-to-date. In any case a large number of books, periodicals, abstracts and trade literature have to be gone through to get a fairly comprehensive survey of a topic.

6 Lack of Co-ordination and Uniform Coverage

There is always some sort of inadequacy with the indexing and abstracting publications. We have a formidable number of periodicals each containing a large number of original papers, comments and communications. Some of these are not documented by any of the indexing services. Some of the periodicals in the 'less popular languages' suffer most. Even in the case of the periodicals selected for documentation, not all the articles are indexed. A rather critical selection is made. It cannot always be said that the articles left out would not be of interest to anyone. Also, comments and communications about an article are not always recorded. While there is no complete coverage of literature, there is duplication of effort and much avoidable waste. A large number of abstracting periodicals give abstracts of the same article. The duplication is even greater if we take into consideration the 'Abstracts' or 'Current Literature Section' included in many normal periodicals. There is again a time lag of six to twelve months from the first appearance of an article in a periodical and the publication of its abstract. For up-to-the-minute information we have to search current issues of periodicals.

Between one aspect of medicine and another there is no clear-out boundary. The results of research in one may have its applications in another. It is always necessary to search for information on a topic in all related fields also. A good number of cases are recorded in law periodicals turned on forensic medicine.

7 Inadequacy of Index

Coming to the abstracts themselves the research work is rarely satisfied with the mere summary of the sense of the paper given. As to indexes we have quite a variety of them some of which are pretty difficult to work with. There is no uniform method. The arrangement does not provide a panoramic survey of the whole subject in all its perspectives. Even indexes in books sometimes present disconcerting surprises. Some time ago one of our new graduates took up Conn's *Current therapy*, 1951. He looked up the index for information on the therapeutic uses of 'Pethidine'. The index did not mention the name at all. A senior physician, however, suggested to him to refer under the alternative name 'Demarol'. Sure enough it was there. The unfortunate thing is that not even a cross-reference is made from the alternative name. Again, the index being based on the title of the article or the abstract it cannot give full indication of the original contribution.

8 Select List of Reference Materials

A SCIENCE

- 1 Bibliography of scientific publications of S.E. Asia (India, Burma, Ceylon).

E CHEMISTRY

- 2 Jacobson (C.A.) *Ed.* Encyclopaedia of chemical reactions. 1946.

E97 Vitamin

- 3 Abstracts of vitamin literature. Chicago. (1947).
- 4 Harris (P.L.) Annotated bibliography of vitamin E, 1940-50.

E986 Hormone

- 5 Compound E (Cortisone) and related hormonal substances. Annotated bibliography. 1949.

G BIOLOGY

- 6 Bibliographia genetica. (Netherlands).
- 7 Collins (P.B.), British natural history: a bibliography. British Book News, 1949. Pp. 47-52.
- 8 Lucas (C.E.) A select bibliography in biology. 1937.

G:6 Genetics

- 9 Bibliography of genetic research published in Italy and Germany, 1939-1945. Compiled by A. Buzzati-traverso. Heredity, V. 1 Pt. 1, Pp. 19-51, July 1947.

G:P Terms

- 10 Jaeger (E.C.) A source of biological names and terms. 1944.

G191 Microbiology

- 11 Annual review of microbiology. (1947—).
- 12 Merck & Co. Inc. Bacterial substances derived from micro-organisms. Annotated bibliography. 1948.

123 FUNGUS

- 13 Imperial Mycological Institute, Kew. Bibliography of systematic mycology, 1945-46. Mimeographed publication No. 3, 1947.
- 14 Wilcocks (C.) and Duncan (J.T.) An annotated bibliography of medical mycology. 1943.
- 15 Smith (G.) An introduction to medical mycology. 3rd ed. 1946. Chapter 15: Mycological literature.

J:4K86 APPLIED ENTOMOLOGY

- 16 U.S. Department of agriculture. Bureau of entomology and plant quarantine. Review of United States patents relating to insect pest control.

K ZOOLOGY

- 17 Smith (R.C.) Guide to the literature of the zoological sciences. 1942.
- 18 Association for the Study of Systematics in relation to General Biology. Bibliography of key works for the identification of British fauna and flora. Edited by John Smart. 1942.

K86 Insect

- 19 Chamberlain (W. J.) Entomological nomenclature and literature. 2nd ed. 1946.

K9 Vertebrate

- 20 Wood (C.A.) *Comp.* An introduction to the literature of vertebrate zoology. 1931.

L Medicine

Laa BIBLIOGRAPHY OF BIBLIOGRAPHIES

- 21 Selected list of bibliographies, Union lists, etc., in medicine and allied subjects, mostly published during the period 1940-1952.
- 22 Royal Society, London. A list of periodicals and bulletins containing abstracts published in Great Britain. 1950. Appendix: Partial list of journals giving abstracts published in the British Commonwealth.

La BIBLIOGRAPHY

(Open)

- 23 Squibb (E.R.) & Sons. Medical journal abstracts ; abstracts from medical journals throughout the world.
- 24 Excerpta medica. (In 15 different subject sections). 1 Anatomy, anthropology, embryology and histology ; 2 Physiology, bio-chemistry and pharmacology ; 3 Endocrinology ; 4 Medical micro-

biology and hygiene; 5 General pathology and pathological anatomy; 6 Internal medicine; 7 Pediatrics; 8 Neurology and psychiatry; 9 Surgery; 10 Obstetrics and gynaecology; 11 Otorhino—, laryngology; 12 Ophthalmology; 13 Dermatology and venereology; 14 Radiology; 15 Tuberculosis and pulmonary diseases (1947).

- 25 Abstracts of world medicine. London. (1944—)
- 26 Voigt (W.) Medizinische bibliographie. Buch- und Zeitschriftener-scheinungen, 1946-1948. 1949.
- 27 Bibliographical bulletin. (International Association of the Medical Press, Milan). 1949.
- 28 Current list of medical literature. Army Medical Library. 1950—
- 29 Bibliografia medica portuguesa. 1946.
- 30 Periodicas portuguesas de medicina e ciencias subsidiarias. Issued by Instituto para a alta cultura, Centro de documentacao cientifica, Lisbon, 1949—.

3091 *Periodicals in medicine* (Closed)

- 31 Postell (W.D.) An introduction to medical bibliography. 1945.

Lk (Encyclopaedia)

- 32 Kelly (E.C.) Encyclopaedia of medical resources. 1948.
- 33 Thornton (J.L.) Medical books, libraries and collectors: a study of bibliography and the book in relation to medical sciences. 1949.
- 34 Bishop (W.J.) British medical books of the last five years. British Book News, 1944. Pp. 37-44.
35. Royal College of Physicians of London. List of serial publications in the library of the Royal College of Physicians of London. 1950.

- 36 Medical Library Association. A handbook of medical library practice, including annotated bibliographical guides to the literature and history of the medical and allied sciences, ed. by J. Doe. 1943. Pp. 256-544.
- 37 Richnell (D.T.) Ed. English index to Soviet medical periodicals available in London libraries. 1949. V. 1.
- 38 Bibliographia medica helvetica. 3V.
- 39 Nevole (S.) and Ruzicka (K.) Bibliographia medica Cechoslovaca. 2V.
- 40 Index medicus danicus; ed. by A.G. Drachmann. 1950.

L^b HISTORY

- 41 Bishop (W.J.) Recent British writings on the history of medicine. British Book News, 1949. Pp. 9-13.
- 42 Garrison (F.H.) A medical bibliography; a checklist of texts illustrating the history of the medical sciences. Originally compiled by the late F.H. Garrison...and now revised with additions and annotations by L.T. Morton. 1943.
- 43 Bell (W.J. Jr.) Bibliography of history of medicine of United States and Canada. 1949. Bulletin of the History of Medicine, 24, 541-558, November-December, 1950.

L^m PERIODICAL

- 44 World medical periodicals. New world list of periodicals of the medical and allied sciences published by the UNESCO and WHO.
- 45 Consolidated catalogue of journals and periodicals of certain medical colleges, schools, universities, etc., in the Dominion of India. V. 2 corrected up to 31st December 1945, 1949.

- 46 Pharmaceutical journals and their abbreviations. (Contained in the Report for 1942, Committee on Libraries, American Association of Colleges of Pharmacy). In American journal of Pharmaceutical Education 7, 187-217 (1943); 8, 487-490 (1944).
- 47 Army Medical Library, Washington, D.C. List of medical journals published in Japan. 1949.
- 48 Medical Library Association. Periodicals and serial publication Committee. Checklist of U.S.A. and Canadian library holdings of Austrian, Belgian and Italian medical and dental periodicals, 1939-1948. 1950.

Lx AUTHOR

- 49 Le Fanu (W.R.) A bio-bibliography of Edward Jenner.

L.2 INDIA

- 50 National Register of Scientific and Technical Personnel in India. V. 2 in two parts: Medical Personnel. 1950-1951.

L.73 USA

- 51 American Medical Association. Bureau of Medical Economic Research. Annotated bibliography of group practice, 1927-1950. Bulletin 15.

L:2 ANATOMY

- 52 Choulant (L.) History and bibliography of anatomical illustration. 2nd ed. 1945.

L:4:14 Hospital

- 53 Index of current hospital literature. American Hospital Association. 1945—.

L:4:64 Physiotherapy

- 54 Cyriax (J.) The literature of physiotherapy, 1939-1945. British Book News, 1947. Pp. 13-18.

L:42 BACTERIAL DISEASE

- 55 McCoy (E.) McClung (L.S.) The anaerobic bacteria and their activities in nature and disease: a subject bibliography. 1930 2V.

L:421 Tuberculosis

- 56 Tuberculosis index and abstracts of current literature. (Quarterly) 1946—.
- 57 Waksman (S.A.) The literature on streptomycin, 1944-1948.

L:43 PARASITE

- 58 Grinnell (M.B.) and Hawes (I.L.) Bibliography on lice and man. 1943.

L:47 STRUCTURAL DISEASE

- 59 Bulletin on current literature: a bibliography for workers with the handicapped. National Society for Crippled Children and Adults. (Monthly) 1946—.

L:47:7 Surgery

- 60 Fanu (W.R.) British surgical literature of the war years. British Book News, 1946. Pp. 32-37.

L:5 PREVENTIVE MEDICINE

- 61 Bibliotheque de L'Institute Pasteur, Paris. Catalogue des periodiques et congress des bibliotheque de l'Institut Pasteur. 1951.

L:51 VITAL STATISTICS

- 62 Bulletin de documentation de la sante publique et de la population. Paris. (1946—).

L:573 Food

- 63 Great Britain. Department of Scientific and Industrial Research. Index to the literature of food investigation. 1949.

L:6 PHARMOCOLOGY

- 64 Urdang (G.) History, ethics and literature of

- pharmacy. *American Journal of Pharmaceutical Education* 8, 491-503 (1944).
- 65 Boig (F.S.) and Brown (E.) Chemical periodicals in the fields of pharmaceutical, cosmetic and perfume chemistry. *The Merck Report* 59, 25-28 (1950).
- 66 Hooking (G.) Periodicals pertaining to pharmacognosy; a preliminary list. *American Journal of Pharmaceutical Education*, 7, 217-235 (1943).
- 67 Lothian (A) Pharmaceutical literature, 1939-1946. *British Book News*, 1949. Pp. 31-38.
- 68 Biotin. Annotated bibliography. 1944.
- 69 Winthrop Chemical Co., Inc. Penicillin. Annotated bibliography. 1943.
- 70 Bibliography on pencillin. *British Journal of Surgery (Supplement)* 32, 217-224, July 1944.
- 71 Whalley (M.E.) Abstracts on pencillin and other antibiotic substances. 1945.
- 72 Gawking (F.) and Lawrence (J.S.) The sulphonamides. 1950. (Bibliography).
- 73 Pfizer & Co. Inc. Terramycin. Review of literature (1951).

L183 Ear

- 74 Peer (L.A.) Plastic surgery in 1942; summaries of bibliographic material available in the field of otolaryngology. *Archives of Otolaryngology*, 38, 171-189, August, 1947.

L185 EYE

- 75 Digest of ophthalmology and otolaryngology (Monthly) 1939
- 76 Ophthalmic literature. 1947—.
- 77 Rucker (C.W.) and Keys (T.E.) Atlases of ophthalmoscopy. 1950. (A catalogue).

L192:415 Rheumatism

- 78 (British) Empire Rheumatism Council. A bibliography of cortisone. 1950.

L214 TOOTH

- 79 Index to dental literature in the English language, American Dental Association, Bureau of Library and Indexing Service. 1945-47. 1949.

L291 LIVER

- 80 Curity Suture Laboratories. Jaundice and Surgery. Bibliography and extracts of literature, 1940-45.

L3:71 Circulation in Brain

- 81 Physiology of the circulation of the brain: an annotated bibliography 1938-1948. Physiological Reviews, 32, July 1952, Supplement No. 1. (437 pages).

L9E OLD PERSON

- 82 U.S. Veterans Administration. Special Services. Library Service. Medical and General Reference Library, Washington, D.C., Care of the aged. Selected bibliography, 1940-50.
- 83 Griffin (J.J.P.) Classified bibliography on geriatrics and the care of the aged. 1948.
- 84 Shock (N.W.) A classified bibliography of gerontology and geriatrics. 1951. (Continued in Journal of Gerontology.)
- 85 U.S. Federal Security Agency. Selected references on aging. An annotated bibliography. 1952.

L9F Women

- 86 Abstracts of world surgery, obstetrics and gynaecology. London, 1944—.

L9H TROPICAL MEDICINE

- 87 Barnard (C.C.) Tropical medicine and hygiene:

a selection of British publication. British Book News, 1949. Pp. 31-37.

L9Y AVIATION MEDICINE

- 88 A bibliography of aviation medicine. Yale Medical Library. publication 5, 9. 2V. 1942-44.
- 89 Hoff (E.B.) and Fulton (J.F.) A bibliography of aviation medicine. 1943.
- 90 Gallouni. Essai de classification documentaire du médecine aeronautique. 1950.

MC5 OPTICIANS' TRADE

- 91 British Optical Association Library and Museum. Catalogue. 1932-35. 2V.

S PSYCHOLOGY

- 92 Louttit (C.M.) Handbook of psychological literature. 1932.

SM PSYCHO-ANALYSIS

- 93 Rickman (J.) Index psycho-analyticus, 1893-1926. 1928.

PAPER 2·15

INTERNATIONAL RELATIONS

Girja Kumar and A.K. Bhatnagar

[Gives a select bibliography on reference books and bibliography on International Relations and the background for the same]

1 Introduction

Broadly speaking, "International relations" impinges upon every field of human activity involving relation between different States. This paper covers only contemporary history, international economics and international law. Moreover, this bibliography is based on materials available in a young, but growing library. As a result, more stress has been placed on reference books published during recent years. Many important reference books have not been listed due to their

non-availability in our library. Due to limitation of space, a host of year-books and who's whos dealing with individual countries and books on international economics have been excluded from this article. Bibliographies and abstracting periodicals have been included in greater proportion. Except for a few items, reference books not in English language have also been excluded.

The non-availability of source materials in a country is in inverse proportion to its economic and political development. Applying this test the amount of reference materials on Africa, Latin America, South-East Asia and Middle East is scanty. In many cases they are unreliable too. Take Africa. The kind of year-books available on African countries are more of the kind of tourist guidebooks, produced by developed countries, mostly under official auspices. They do not do justice to the colonial peoples. Each country should produce at least one year-book, one abstracting periodical and one cumulative bibliography on its international relations.

The regional bibliographies prepared by the Division of Bibliography, Library of Congress, are of value. They have also recently undertaken the publications of the following three bibliographical periodicals:—

- 1 Southern Asia : Publications in Western Languages ;
- 2 Monthly List of Russian Accessions ; and
- 3 East European Accessions List.

2 List of Oft-used Reference Materials

*n*1 Year-book

- 1 International year book and Statesmen's who's who. 3 pts. Annual 8,000 biographical notes.
- 2 New international year book. 1907—. Annual.

z Generalia

*z*1,*dn*. International Organization

- 3 Union of International Associations. Year book of international organizations. 1948—. Brussels. Annual.

z5 Europe

- 4 Slavonic encyclopaedia. (Philosophical library) 1949. New York.

zG Gandhi

- 5 Deshpande (P.G.). Gandhiana: A bib of Gandhian literature. 1948. Ahmedabad, Navjivan Publishing House.

Σ Social Sciences

- 6 Annual register. 1758— London. Longmans. A review of public events. General index for the volumes covering 1758 to 1819.
- 7 Council on Foreign Relations. Foreign aff bib: A selected and annotated list of books on international relations. 2 V. 1919-1932, 1933-1942. 1933, 1945. New York. Based on bib printed in *Foreign Affairs*. Author index only.
- 8 Facts on file. 1940— New York. Weekly world news digest. With bias towards American news. Annual cumulation.
- 9 Fondation Nationale des Sciences Politiques. Bulletin analytique de documentation politique, 'economique et sociale contemporaine. 1946— Bimonthly. Articles only. Sometimes, brief abstracts.
- 10 Institut National de la Statistique et des' Etudes Economiques and Association de Documentation Economique et Social. Documentation economique. 1934—. Quarterly. Brief abstracts of nearly 300 articles per issue.
- 11 Keesing's contemporary archives. 1931—. London. Weekly diary of world events with index continually kept up-to-date. Cumulated in 3 year vol.
- 12 Lib of International Relations. World in Focus. 1945— Chicago. Bi-monthly. Annotated index of selected materials.

- 13 Lib of the Palace of Peace. Catalogue (and 3 supplements and 2 index vols.). Leyden. A comprehensive and reliable bib on international aff. Classified. No annotation. Supplements bring it forward to 1929.
- 14 London School of Economics. London bib of the social sciences. V 1—1931—London. Lists materials available in nine London libraries and special collections. Subject bib. V 1-3 record more than 600,000 entries.
- 15 New York Times. Index. 1913—New York. Annual.
- 16 U.N. Catalogue of economic and social projects. 1949—New York. Annual. Work carried out by UN, its commissions and committees, and its various specialized agencies.
- 17 U. N. Monthly list of books catalogued in the library of the United Nations. 1948—Geneva. Classified. Brief notes.
- 18 Orbis: Encyclopaedia of extra-European countries. 1938—London. Europa Pub.

Σ.1-3 British Empire

- 19 Roy Empire Society. Subject catalogue of the library. V 1—1930—Includes periodical articles also.

Σ.4 Asia

- 20 Baqai (I.H.). Books on Asia. 1947. New Delhi. Indian Council of World Aff. Annotated. Information about some items incomplete.
- 21 Embree (John F.) and Dotson (Lillian Ota). Bib of the peoples and culture of the mainland of Southeast Asia. 1950. New Haven. Yale Univ. Annotated. Books and articles in English and other European languages. A special section on the tribes of South China.
- 22 Far Eastern Association. Far Eastern bib. 1941—Ithaca. Annual. Classified list of books and articles.
- 23 Middle East. 1948—London. Europa Pub. Annual.

- 24 Middle East Inst. Bib of periodical literature on the Near and Middle East. 1947—Washington. Quarterly. Brief annotation.

Σ .41 China

- 25 China. Information (Ministry of—). China handbook. 1937-1945. Edn 3. 1947. New York. Macmillan. Includes a Who's who.

Σ .436 Indonesia

- 26 Kennedy (Raymond). Bib of Indonesian peoples and cultures. 1945. New Haven. Yale Univ Press. Mainly based on Dutch source materials. Main focus on anthropology and sociology.

Σ .44 India

- 27 Indian annual register. 1922-1947. Calcutta. Biannual. A digest of public affairs of India.

Σ .5 Europe

- 28 Europe: Encyclopaedia of Europe. 1930—London. Europa Pub. Loose-leaf.

Σ.58 Russia

- 29 Grierson (Phillip). Books on Soviet Russia 1917-1942. 1943, London. Meuthen. Annotated.

- 30 Joint Committee on Slavic Studies. Current digest of the Soviet Press. V 1-1949-New York. Weekly. Complete, condensed or summarised translations of all articles in *Pravda* and *Izvestia* and selected articles from 40 Soviet magazines. Quarterly index.

Σ.59 Turkey

- 31 Birge (John Kingsley). Guide to Turkish area study. 1940. Washington. American Council of Learned Societies. Narrative bib in introduction.

Σ .6 Africa

- 32 International African Inst. African abstracts. 1950—London. Quarterly. Mainly anthropology, linguistics; but also archaeology, folklore, sociology and history.

- 33 Lobe (Juan Fontan). *Bibliografía colonial*. Madrid. Bib of 17,000 articles and books, with special reference to materials in Spanish and Portuguese. Alphabetical.

U Geography

- 34 Webster's geographical dictionary : A dictionary of names of places with geographical and historical information and pronunciation. 1949. Springfield. Merriam.

U.43 Southeast Asia

- 35 Pelzer (Karl J.) Selected bib on the geography of Southeast Asia. 2 pts. New Haven. Yale Univ. Includes articles also.

V History

VI:19 Foreign Relation

- 36 Carnegie Endowment for International Peace. Current research in international aff. 1938-New York. Annual. Bib of work in progress by private agencies in English-speaking countries and India.
- 37 Lond Inst of World Aff. Year book of world aff. 1947—London. Stevens. Annual. Symposium of articles.
- 38 Roy Inst of International Aff. Survey of international aff. 1920-London. Annual. Cumulative index for 1920-1930.
- 39 Roy Inst of International Aff. Documents on international aff. 1928-London. Annual. Supplements the annual *Survey of international affairs*.
- 40 World Peace Foundation. Documents of international organizations. 1947-1950. Boston. Quarterly. A select bibliography.
- 41 World diplomatic directory and world diplomatic biography. 1950—London. Diplomatic Publishers.

VI:2 Constitutional History

- 42 Council of Foreign Relations. Political handbook of the world. 1927-New York. Annual. Information about parliament, parties and press in each country. Excludes colonial area.

VIN4 United Nations

- 43 Annual review of U N aff. 1949-New York. Columbia University Press. Annual.
- 44 U N Year book of the United Nations. 1946-New York. Annual-Official account of the activities, including those of the specialized agencies.
- 45 United Nations Association. Year Book. 1946-London. Hutchinson. Annual. Summary report of the U N activities.

V4 Asia

- 46 Institute of Pacific Relations. Far East digest. 1947- New York. Monthly. Detailed abstracts of articles on political problems of Asia excluding the Middle East. Mimeographed.

V44 India

- 47 Indian Council of World Affairs. India in world aff. 1947-1950. New Delhi. Annual. Review of India's foreign relations.

V56 Great Britain

- 48 Gr Brit. Foreign Office. British and foreign state papers. V 1. 1841-London. Annual. Contains treaties, correspondence about foreign affairs and texts of the constitutions of foreign countries and similar organic laws.

V58 Russia

- 49 Morley (Charles). Guide to research in Russian history. 1951. Syracuse Univ Press. Annotated. The most important entries marked with asterisk. Location of all items in one or more American libraries given.
- 50 Diplomatičesky slovar. 2. v. 1948, 1950. Moscow. Gosplizdat. Edited by A.Y. Vyshinsky. This diplomatic dictionary lays special emphasis on the foreign policy and diplomacy of the USSR.

V73 United States

- 51 Brookings Institution. Major problems of United States

policy. 1947-Washington. Annual. It is supplemented by *Current developments in United States foreign policy*.

- 52 Council of Foreign Relations. United States in world affairs. 1931-New York. Annual.
- 53 U.S. State (Department of-) Foreign relations of the United States. 1861-Washington. Annual. Documentary record of American foreign policy published continuously except for 1859.

Y Sociology

Y.63 South Africa

- 54 Schapera (I.) Select bib of South African native life and problems. 1941. London. Humphery Milford.

Y.93 Pacific Islands

- 55 Taylor (C.P.H.). Pacific bib: Printed matter relating to the native peoples of Polynesia, Melanesia and Micronesia. 1951. Wellington. Polynesian Society.

Y: 5 Population

- 56 Woodrow Wilson School of Public and International Aff. Population index. 1935-Quarterly. A very brief annotation, or an abstract rarely exceeding fifty words in each case. Articles and books.

Z Law

Z1 International Law

- 57 Hackworth (Green Haywood). Digest of international law. 1940-1944. 8V. Washington. Government Printing Office.
- 58 Lond School of Economics and Political Science. Annual digest of public international law cases. 1919-1922-London. Butterworth. Annual.
- 59 Meulen (Jacob ter) and Diermanse (P. J. J.). Bibliographie des écrits imprimés de Hugo Gratius. 1950. The Hague. Nychoff. Annotated bibliography with typographical details.

- 60 Roy Inst of International Aff. British year book of international law. 1920-21-London. Annual. Symposium of articles of the day.

Z1:3 Treaty

- 61 Carnegie Endowment for International Peace. International legislation. 1918-1921-New York. Irregular. A collection of the texts of multipartite international instruments.
- 62 Gr. Brit. Foreign Office. Treaty series. 1892—London. Stationery Office. Annual. Command Papers containing treaties and agreements are bound together.
- 63 U. N. Treaty series. V.1-New York. Irregular. Treaties and agreements recorded with the Secretariat of the U.N.

Z1:88 International Court

- 64 International Court of Justice. Year book. 1947-Leyden. Sythoff. Annual. Provides information concerning court's organization, jurisdiction and activities.

PAPER 2-16

CANONS OF ABSTRACTING

S.R. Ranganathan

[Traces the emergence of Indexing Periodical and Abstracting Periodical. Determines their value. Enumerates 14 canons of abstracting. Groups them under 'Negative', 'Positive', 'relating to time-lag' and relating to 'personnel'. Recommends, in the light of these canons, the desirability of an Abstracting Periodical being put in joint charge of a co-ordinating subject expert and library expert with experience in reference service and depth classification].

1 Effect of Large Number

A vast number of periodicals is now used for the communication of nascent thought. Their number is vast not only in the universe of knowledge taken as a whole, not merely in any single main class, but even in classes of great intension.

11 FINANCE

In the first place their number takes their annual cost to beyond the financial capacity of any individual. It takes them also beyond the capacity of any single library. Hardly any single library in the world takes even 25% of this form of medium of communication.

12 INDIVIDUAL'S CAPACITY

Secondly, let us assume that all the periodicals are made physically available in one library. Even then their use goes beyond the physical, mental, and time capacity of any individual.

13 ARTICLES OF INTEREST

Apart from sheer number causing this difficulty, no individual is likely to benefit by turning through every page of every periodical. To do it merely to locate articles of interest to him is by itself wasteful. But this waste can be eliminated by providing a bare index to micro thought contained in periodicals.

2 Thought of Interest

Even then a reader may not find equal interest in all articles either listed under his favourite author or under his favourite subject. The whole of some articles—every detail in them—may be beneficial to him. At the other extreme some articles might prove to be mere mirage. Between these two extremes, there will be all grades in the proportion of the total thought of interest to him embodied in them. But to know to which category an article belongs, the reader will have to open up each of the periodicals embodying them. He will have to glance through the article. The number in his total "Apupa" pattern of the articles is now too vast to admit of their being perused by a reader within the time he can spare for the purpose.

21 INDEXING PERIODICAL

The value of an indexing periodical arises out of this situation. Let us take the average length of an article to be ten pages.

Let us further take the number of articles in the Apupa of a reader appearing in a year to be 1,000. Then he will have to turn through 10,000 pages in a year.

22 ADVANTAGE

On the other hand, let us calculate the number of pages needed for their index. On an average 50 indexes can appear in a page. Then the number of pages of indexing periodical to be perused by him gets reduced to 200. A perusal of these 200 pages reduces the time required for persual to 1/50. This by itself is a great saving.

23 CLASSIFIED FEATURING

An arrangement of the indexes by the name of the author or by the title of the article will oblige a reader with a particular umbra in his Apupa to turn through all the 200 pages of the index. On the other hand, let us assume that the articles are minutely classified by an individualising, expressive, analytical system of classification. Let us further assume that feature headings are added in a most helpful way. An account of such featuring has been described in Ranganathan (S.R.): *Abstracting periodicals—Standard for a layout* forming paper 253 of *Public library provision and documentation problems*, ed by S.R. Ranganathan (Indian Library Association, English series, 2), 1951. The suggestions contained in the above article have been reduced to a code of precise rules in Chapter 91 of Ranganathan (S.R.): *Classified catalogue code*, edn 3 (Madras Library Association, publication series, 17), 1951. Then it will be possible for the reader to eliminate several of the entries in the index by merely looking at the feature headings.

3 Abstracting Periodical

By the above mentioned helps, the range to be perused by the reader will be reduced perhaps to 1/500 of the time taken for looking up the original articles. The next point for consideration is reduction of time needed

for actually looking up the original papers themselves, forming the surviving residue in his field of interest. It is here that a good abstract effects saving. By the use of abstracts, it may be possible for the reader to eliminate many more items in the residue. The particular point sought by him might have been brought out by the residue. If the quality brought out does not warrant it, he need not take pains to look up the original. By the help of an abstracting periodical, the range of originals to be perused by the reader will be reduced to about a half indicated by the bare index.

31 QUALITY

To give this measure of help, the quality of the abstract should be of a high order. It should embody in it all the essential information contained in the original article.

For example it should :

- 1 Indicate the exact boundary of the subject treated ;
- 2 Give the new thought embodied ;
- 3 Indicate new factual data recorded ;
- 4 State any new apparatus, diagram or other aid described ; and
- 5 Relate it to any other work intimately associated with it.

32 QUANTITY

The incorporation in the abstract of all the information demanded in quality will naturally increase the size of the abstract—the number of words used. It is not desirable to put in more words than can be taken within a comfortable sweep of the eye. The conflict thus arising between quality and quantity should be reconciled in the abstract.

4 Negative Canons

This reconciliation can be brought about by observing certain negative canons.

- 1 Don't provide any words in the abstract to give information readily inferable from the feature headings and their sequences.

The Canons of Context and Enumeration, described in Ranganathan (S.R.): *Prolegomena to library classification* (Madras Library Association, publication series, 6) 1937, 69-72 should be fully relied upon. The feature headings stand arranged in helpful sequence by their class numbers. The reader need not know the class numbers. The headings, which are in natural language, will follow one another in more or less the sequence in which an expert in the subject would be familiar with and appreciate. This mere context of the entry amidst the feature headings carries with it a considerable information intelligible and valuable to an expert reader.

2 Don't provide, by words in the abstract, information conveyed by the title of the article.

3 Don't give, by words in the abstract, information going with the name of a well known author of known standard.

The above canons amount to setting up symbiosis between classified arrangement with adequate feature-headings, the words in the heading and the title parts of the entry, and the abstract.

4 Don't swell the abstract with words describing the sample used for study—the Guinea-Pig so to speak.

Normally this will neither be of interest nor necessary. The chief interest is only in the method used and the findings arrived at.

5 Don't attempt complete sentences. Use the so called telegraphic language—without, of course, sacrifice of precision or clarity.

5 Positive Canons

1 If the range covered by the article is shorter than the ultimate class under which it is entered, indicate the exact boundary of the subject.

Classificatory technique has not been sharpened to produce co-extensive class numbers for newly emerging micro thought. Till a self-perpetuating scheme is properly designed, new micro thought will outreach the capacity of classification. The extra intension of the new thought should be defined either by a "verbal augmentation" of class numbers or by a statement in the abstract. The former will be more economical.

2 State the primary advance in knowledge contained in the paper.

3 State any other secondary advances.

It often happens that a paper may appear in the penumbra region of the Apupa of other disciplines. For example, a paper on the photographic method of studying viscosity may contain information on photographic technique or photographic materials. A local abstract, prepared for known clientele, can mask away all such secondary points. But an international abstract which has necessarily to be impersonal cannot do any such masking.

4 Mention any new instrument or technique or nomograph or any other new aid used. Indicate their essential feature.

This is a very difficult part in the abstract. It needs much judgement. This may swell the size of the abstract. This must be avoided.

5 Give the most outstanding factual data if they are not too many. Otherwise indicate the nature of the data provided.

This also requires considerable judgement. There are certain papers full of tabular statements which it is very difficult to abstract, bringing out the data. In such cases, looking up the paper can not be escaped.

6 Time Factor

Abstracting requires a careful reading of the article. Reading requires time. This time adds to the total time-lag between the release of the article and its abstract. A method of reducing the time-lag is for the publisher or the sponsoring authority to send a copy of the galley proof to the abstractor as and when it is ready. The page reference to the entry may be furnished by latter at forme-proof stage. We may therefore add this as a desirable canon to be worked upto:

1 Pre-natal abstracting should be done, to minimise time-lag.

7 Personnel

There are three classes of personnel to consider:

- 1 Author ;
- 2 Library-expert ; and
- 3 Subject expert.

71 AUTHOR

The author knows the subject matter of the article best. His only handicap is that he views the subject from his own personal angle. His abstract may not therefore be always impersonal. Secondly the author is too absorbed in his own speciality to get a mood either to absorb the spirit of the canons for abstracting or to implement them. The number of papers written by an author may not ordinarily justify his being asked to pick up sufficient knowledge of abstracting according to canons or to acquire facility in applying them correctly. Even if he does, he will not have occasion to exercise that knowledge sufficiently often to keep it alive. Even otherwise the various articles will get scattered in regard to agency if the author is made the agency. There should, therefore, be in any case, a co-ordinating person to secure uniformity of standard in the abstracts.

72 LIBRARY EXPERT

The Library Expert is perhaps best qualified to understand and implement the largest number of canons of abstracting. He serves the abstracts. He knows the qualities expected in them. Even among librarians, one with experience in reference service and special knowledge of depth classification and cataloguing is best suited to abstracting work. His handicap will be in regard to the newly formed specialised thought of great intension in a region already of narrow extension. Often the thought will be too new to have been filtered down to a comprehensive book level, to enable the librarian to pick up sufficient familiarity.

73 SUBJECT EXPERT

The Subject Expert has got all the handicaps of the author. Perhaps a full-timed abstractor drawn from subject experts can overcome the handicaps connected with the understanding of the spirit and the implementing of the canons of abstracting.

The only question is whether society can afford to release a really able man with capacity to do creative work in his own subject, to take up abstracting work.

74 LANGUAGE

Language not familiar to the abstracting personnel will necessitate bringing in a translator. We are experiencing a great difficulty in this matter. Translation from ordinary language used by the common man and current in common exposition is different from the technical language used in a specialised subject. Indeed the two languages are quite different, though apparently the same. The risks thereby over-shadowing the province of the translator can perhaps be minimised if the abstracting is done by a subject expert with the language of the article as mother tongue and the translator translates only the abstract. This will also tie up helpfully with the canon of pre-natal abstracting mentioned in section 6.

75 INTERDEPENDENCE

The interdependence of classification and abstracting should be borne in mind. Many of the negative canons can best be observed if the classification is done earlier. But if the scheme of classification admits of co-extensiveness even in the case of micro thought, the classifier may need the help of subject expert to decide the last few digits of the class number. This will be specially so when the classifier has to use his autonomy in constructing his own isolate numbers consistent with all the canons relevant to them. Taking all this into consideration, perhaps the following canons may be enunciated:

- 1 The author of an article should provide the abstract conforming as much as possible to the negative and the positive canons of abstracting.
- 2 A co-ordinating expert employed by the abstracting agency should revise the author's abstract.
- 3 The abstracting agency should also have an expert in classification. He and the co-ordinating subject-expert should work in mutual consultation.

MATHEMATICAL PHYSICS**A. Narasinga Rao**

[Defines the scope of Mathematical Physics. Lists the Indian periodicals having articles on the subject. Gives an annotated list of 7 abstracting periodicals and 5 other reference materials. Indicates possible new trends. Gives a personal experience].

1 Junction of Subjects

Mathematical Physics is a liason subject situated at the junction of two important streams of human thought—Mathematics, an ancient, highly abstract and basic intellectual discipline, and Physics, one of the most ancient of the experimental sciences. Such confluences of diverse streams are fertile and beautiful regions in our scientific heritage where the mind loves to linger watching the interplay of each on the other, even like the confluence of sacred rivers which have been declared by the ancient Hindus as ideal spots for purificatory bathing. The progress in knowledge has brought about many such junctions of streams which originally flowed apart; but perhaps the most ancient, the most intimate and the most fertile has been that of Mathematics and Physics. The history of science shows that, like a pair of perfectly matched lovers, each has exerted a tremendous and often unobtrusive influence on the development of the other.

2 What is Mathematical Physics?

What is the boundary which separates mathematical Physics from mathematics on the one hand and physics on the other? When we are dealing with the relations between abstract concepts which follow from their definitions themselves, leading to the creation and study of other concepts, as we do in the theory of numbers, abstract algebra, topology, etc., we are obviously well within mathematics. On the other hand when we deal with the results of observations of the behaviour

of matter in the world we live in, of the kind we call "Physical", such as the behaviour of bodies under forces, when subject to heat etc. we are well within Physics. That the results of such experimental observations have to be embodied in equations using the language of mathematics does not make the subject "mathematical physics" any more than the use of the English language for expressing the results make them a branch of English literature. The two streams are still following apart. Thus Coulomb's inverse square law of force between electrical charges is a result in Pure Physics, if it is considered an experimental result.

Mathematical Physics (or theoretical physics) may be said to be born only when as a result of experimental observation, we create abstractions and postulate to these certain properties, with a view to deducing from them by mathematical reasoning, the known experimental results. We step off, as it were, from the physical world of experiment to the world of creative imagination and thence back again, by mathematical deduction from our created postulates, to the world of observation. Such a jump from reality to abstraction and back would hardly be justified, if we could explain only the observed results—though even here there is a definite gain if a large number of unrelated results could be obtained as a consequence of a few simple assumptions. In actual practice, our postulates not only enable us to deduce all the known results (otherwise we should have adopted a different set of postulates!), but also help us to predict what would be the result of conducting a new experiment not performed till now. The performance of such new experiments and the incorporation of the results thereof into the theoretical structure, suggesting again further experiments, leads to the growth of an elaborate structure of thought, dealing in its magnificent sweep with diverse fields of experimental results once thought unconnected. This is indeed "Mathematical Physics" or "Theoretical Physics".

Well known examples of such structures are Maxwell's electro-magnetic theory, Newton's theory of universal gravitation, statistical mechanics, wave mechanics etc. Examples of similar structures in the course of erection are atomic structure, the quantum theory of fields, the theory of turbulence in fluid motion, finite deformation in elasticity, supersonic flow, cybernetics etc.

3 Periodical

Outside India, there are over 30 front-rank periodicals in Mathematics and Physics, which contain articles in Mathematical Physics. Some of the latest topics in Mathematical Physics on which separate periodicals are beginning to appear are: Nuclear physics, Tensors, and Computations. The Tensor Society of Sapporo, Japan, has been publishing the periodical "Tensor" from 1938, of which 9 numbers were published till 1949. Its second series began in 1951. The Tensor Club of Great Britain has been recently formed. It proposes to publish a periodical. Neucleonics (U. S. A.) and Atome (France) are devoted to atomic physics.

4 Indian Periodical

While there are no periodicals in India exclusively devoted to Mathematical Physics, the following contain papers on it, though covering Pure Mathematics, Pure Physics, and other subjects:—

- 1 Proceedings of the Indian Academy of Sciences, Bangalore.
- 2 Proceedings of the National Institute of Sciences of India.
- 3 Journal of the Indian Mathematical Society, Bombay.
- 4 Proceedings of the Calcutta Mathematical Society, Calcutta.
- 5 Ganita (formerly "Proceedings of the Benares Mathematical Society"), Lucknow.
- 6 Indian journal of physics, Calcutta.

5 Abstracting Periodicals

There are yet no abstracting periodicals for mathematical physics as such. But all the abstracting periodicals for Mathematics or Physics, mentioned below, cover this subject.

1 *Revue semestrielle des publications mathematiques*, (Societe Mathematique d'Amsterdam). 1893-1934. This was the first in the field. Began as a list of titles. Later, added reviews. Arrangement, by periodicals. The articles of each periodical arranged as in the original. Each article given classification mark according to an accepted international scheme for mathematics. A topic index at the end. For several years, the only abstracting periodical for mathematics. The collaborateur (=reviewer) for each periodical was one connected with it. It was a "collaborateur" for papers published in the *Journal* of the Indian Mathematical Society for several years.

2 *Zentralblatt fur Mathematik*, 1920-40. 1952-. Arrangement by subject. Ideal abstracts. Time-lag not more than 6 months. Books also reviewed.

3 *Mathematical reviews*. (American Mathematical Society and 12 others including Indian Mathematical Society). 1940—. Financial help from the Carnegie Corporation, Rockefeller Foundation etc. Reduced rates to the members of sponsoring societies and to its panel of reviewers spread all over the world. Standard high. Publication prompt. Arrangement by subjects. Books also reviewed. Microfilm service offered. Reviews of applied mathematics grouped under Relativity, Mechanics (which includes Hydrodynamics, Aerodynamics, Acoustics, Elasticity and Plasticity) and Mathematical Physics (which includes optics, electromagnetic theory quantum mechanics, thermodynamics and statistical mechanics).

4 *Zentralblatt fur Mechanik*.

This was temporarily suspended during the war. But it has probably resumed publication again.

5 *Applied mechanics reviews*. East on, Pa. U.S.A.

6 *Bulletin Analytique*. Paris, brief summaries of papers in Mathematics, Physics and biology, arrangement by subjects, 90,000 reviews annually from 5,000 periodicals, one issue monthly devoted to mathematics, physics, chemistry, geology and technology. I have not seen any of the reviews 4, 5, 6.

7 *Science abstracts*. (Institute of Electrical Engineers, London). Two sections: Section A (Physics) and Section B (Electrical engineering). Subdivision 51 of A devoted to Mathematics and 52 to Astronomy, Astrophysics, and Geodesy. Physics proper covers Fundamentals, Mechanics of solids and fluids, Vibrations, Acoustics, Optics, Radiation, Spectra etc. Naturally, papers in mathematics find mention only to the extent that they have applications to physics.

8 *Bibliography of Scientific Publications of South Asia*, UNESCO, Delhi. Arrangement by subjects, contains titles of papers.

6 Encyclopaedia

The standard works of reference of the above type in Mathematics and Mathematical Physics are described below:

1 *Encyclopaedie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen*. 6B in 13 T. 1901-23. Monumental work. Narrative bibliography of full coverage. Covers Mathematical Physics.

2 *Encyclopaedie des sciences mathematiques*. Began as a French version of 1. Became independent owing to the need for incorporating later developments in each topic. Discontinued even before pure mathematics was completed.

3 "Memorial des sciences mathematiques" and "Actualities scientifiques et industrielles" are illustrative of a new series of booklets giving narrative bibliography in individual topics.

4 "Handbuch der Physik" is a series of over 20 volumes, giving full data in regard to the different aspects of physics including Mathematical Physics.

5 "Handbuch der experimental Physik" is a similar series.

7 Adequacy and Development

Though Mathematical Physics has no abstracting service devoted exclusively to itself, it cannot be said to suffer on this account. On the other hand important papers on the subject are reviewed both in mathematical reviewing periodicals and in science abstracts. On the other hand, if an exclusive abstracting periodical for mathematical physics were started it would be difficult to say what exactly its coverage should be, and where it should start and stop. The field is also extending daily with the result that Mathematical Physics is today a very unwieldy subject. It is difficult for any young man to master the whole of this field to the extent of making worthwhile contributions to all its branches. When a subject reaches this stage, it is like a joint family whose children are sufficiently grown to establish families of their own, and who find the parental home somewhat overcrowded.

71 SPECIALISED ABSTRACTING PERIODICAL

Accordingly, the desirable lines of development in the immediate future would be two ; firstly, for those in the forefront of research activities, we require promptly appearing abstracting periodicals which specialise in well-developed fields like Relativity, Quantum Mechanics, Fluid Mechanics, Acoustics, Nuclear Physics, Scientific Instruments, etc. Some of the existing specialized abstracting periodicals are: *Astronomisches Jahresbericht* (Germany), *Nuclear Science abstracts* (U.S.A.), *Mathematical tables and other aids to computation* (U.S.A.). These should be in addition to the general abstracting periodicals for mathematics, physics etc., dealing either with papers in all

subjects or with those for which special abstracting periodicals do not exist.

72 APPETISER BOOK

Secondly, for the benefit of those who have passed the stage of collegiate education (M.Sc.) and are working for their doctorates, or are studying up a subject with a view to research therein, we require special booklets to bridge the gap between the collegiate level and the research front, taking the student rapidly from the one to the other in the particular topic treated, giving him an adequate foundation for future work both theoretical and practical, and warning him of the usual mistakes and pitfalls. The presentation should be not too formal but semi-conversational, taking the reader into confidence—just the kind of guidance which a director of research would give to those who work under his guidance—a kind of appetiser books.

73 ACTUALITY

It is a matter for gratification, that both these developments are actually taking place. We are having from time to time new abstracting periodicals which specialise in particular fields, while we are also having a large number of monographs on special topics published by various learned societies, academies, research institutes, and some of the more advanced educational institutions, besides private publications by scholars, which seek to meet the needs of the young man preparing for a research career.

8 Personal Experience

A few years back, I was interested in knowing about a plausible hypothesis. Is it dynamically possible that the outermost satellites of Jupiter which move in a retrograde direction, (that is, in a direction opposite to that in which the planets move round the Sun and the satellites round their

primaries) could have been attracted away from the neighbouring planet Saturn? It is easy to see that if two circles touch externally, and if a point moving one way round along one circle goes smoothly over to the other circle at the point of contact, its rotation will change from direct to retrograde or vice-versa. Now if the centres of the two circles represent the planets Jupiter and Saturn and the two circles possible paths of circulating satellites, we see that a direct satellite of Saturn will, if captured, become a retrograde satellite of Jupiter. That it is only the outermost satellite of Jupiter and the outermost satellite of Saturn (Phoebe) that move in a retrograde direction, lends weight to the hypothesis since these are under a light gravitational pull, and are hence easily captured. In the actual problem one has to take also into account the Sun's attraction and hence the rotation of the whole system round the Sun. I wanted to know if the suggested possibility had been mathematically worked out by any one. References to books on Astronomy gave no clear information, and since abstracting periodicals are comparatively modern, it was difficult to ascertain whether any work had been done on these lines before these had been started. One could hope to get some helpful information from papers on the problem of the three bodies, and from treatments of the n -body problem, especially the "restricted problem" (where the satellite whose motion is under discussion is supposed to be too small to influence the motion of the others). I could get a reference to G.D. Birkhoff's paper on the Restricted Problem of 3 Bodies, and to some papers of Darwin which threw some light on the problem. These references were, however, gathered from books and not from abstracting periodicals, and it looked after a long and laborious search as if the problem had not been considered from the mathematical point of view. Of course, in such cases, one has final resort to experts in the field, and this was what I had to do.

PAPER 2·18

PHYSICS

**R.S. Krishnan, P.S. Narayanan and
V.S. Venkatasubramanian**

[Lists 4 oft-used abstracting periodicals. Suggests an abstracting periodicals for India. Lists the chief Indian periodicals giving articles in physics. Pleads for more elaborate abstracts for articles in languages other than English, French and German].

1 Introduction

Our experience, regarding reference work required in the course of our research, has been that while the facilities afforded to us are quite ample, there is scope for improvement in some directions. We put forward the suggestions below with the conviction that their incorporation into the general scheme would assist the research worker in having access to a wider range of reference material with greater ease and clarity.

At the outset, we would like to mention that research workers of the Physics Department and of the other departments too of the Indian Institute of Science, specialising in any particular branch of Physics read up and themselves gather all the pertinent literature. No reference service to the Research workers exists at the Institute Library. In this important and integral part of the research work, the students are guided by the abstracting periodicals mentioned in section 2.

2 Abstracting Periodicals

1 Bibliographies provided in standard text-books and monographs on the subject, or by standard review articles that lead the students to the up-to-date state of knowledge, e.g., *Reports of progress in physics* (Physical Society, London,) *Reviews of modern physics* (Physical Society, U.S.A.), *Chemical reviews* etc.

2 Abstracts of current papers provided by abstracting periodicals such as

21 *Science abstracts*:

A. *Physical sciences.*

B. *Engineering sciences.*

22 (American) *Chemical abstracts.*

23 *Abstracts of nuclear science*

24 *Physikalische Berichte.*

21 ABSTRACTING PERIODICAL IN INDIA

We should like to mention that an abstracting periodical published in our own country is desirable as it would facilitate quicker dissemination of the work done in the various Laboratories in our country.

3 Quality of Abstracts

The abstracts in the existing abstracting periodicals are, in general, quite authoritative and exact. But with the rapidly receding scientific horizon, the volume of published material has increased by leaps and bounds. (A glance at the catastrophic increase in thickness of the bound volumes of the *Physical review* would convince the most uncompromising sceptic)! A good many abstracting periodicals have produced decennial subject indexes for abstracted material. We feel that this system of subject-indexing should be extended to all abstracting periodicals. At the same time, there has been a tendency (occasioned, no doubt, by the increasing volume of published material) to make the abstracts too brief, almost cursory. The tendency to compress an abstract into a cryptogram should be deprecated. We whole heartedly support a neat system of subject indexing similar to the one adopted by *Science abstracts*.

4 War-Time Materials

We should like to invite attention to another fact. Issues of most of the periodicals published during and immediately after the war years are not available. It is, of course,

true that a good deal of the work done in those tense years, behind the veil of secrecy, has been allowed to see the light of day. Steps taken in the direction of the availability of such periodicals would certainly prevent much repetition and overlapping of work. It is a fact worthy of mention that tremendous advance was made in the field of fundamental research in Nazi Germany during war years. It is thus only proper that this should be made available to the international scientific reader.

5 Linguistic Hurdle

One other point to which we would like to invite attention is the matter of language. It is a fact that any material addressed to the international reader in science has to be in English, French or German. A very large body of work is, however, published in other languages such as Russian and Swedish. Abstracts of such papers have to be, as far as possible, complete. Our experience is that some abstracts—notably of Russian papers—are inadequate and necessitate reference to original papers. Publishers of such periodicals may be requested to attach to the papers with fairly exhaustive English abstracts. Translation Bureaus can achieve a very great deal in this direction.

6 Indian Output

61 The periodicals published in our country, which regularly include publications on topics of Physics, are the following:—

- 1 Proceedings of the Indian Academy of Sciences ;
- 2 Indian journal of physics ;
- 3 Current science ;
- 4 Journal of scientific and industrial research ;
- 5 Proceedings of the National Institute of Sciences ; and
- 6 Journal of the Indian Institute of Science.

62 The main abstracting periodicals in physics at the actual hour have been listed in section 2.

63 Among the periodicals, that regularly devote a section to the abstracting of recent papers on their respective subjects, are:—

- 1 Journal of the Acoustical Society of America;
- 2 Mineralogical magazine ;
- 3 Transactions of the American Geophysical Union ;
and
- 4 Journal de Physics et la Radium.

64 The "Journal of scientific and industrial research" gives good abstracts of Indian papers and patents, in so far as they deal with work of an applied nature.

65 So far as we are aware, no Indian is included in the list of abstracters for the foreign abstracting periodicals in Physics.

PAPER 2-19

CHEMISTRY

T.R. Sheshadri

[Emphasizes the need for reference librarian for literature-search and mentions the necessary qualifications for him. Describes the chief reference books—dictionaries, encyclopaedias, handbooks and tables, abstracting periodicals and reviewing monographs in the different branches of Chemistry. Points out duplication of effort in the field. Gives a list of Indian periodicals with articles on Chemistry. Stresses the need for an Indian expert to prepare abstracts of these articles].

1 Introduction

The following account refers primarily to research work, but it also embodies needs of students studying chemistry or writing up reviews.

11 REFERENCE SERVICE

In any Chemical Investigation the collection of past literature on that particular subject and if possible related topics is a matter of great importance and to a large extent decides also the success of the Investigation. So far it has been the

invariable practice of the investigator or the investigators themselves to make the required literature-search and draw up a review. It is quite unusual in ordinary university laboratories to entrust this matter to a librarian. This does not mean that such a service is unnecessary. It would certainly save a great deal of time for research workers, if specially trained library staff could collect the required literature. However, it should be pointed out that Chemical Investigations are so frequently highly specialised in nature and hence the reference service should have properly trained graduates in chemistry with wide knowledge in order to be effective. Further for this work persons of high character, active and eager to be helpful are required because errors can easily arise and the blame will not usually be placed on the library, but on the investigator. Even though chances of error are great, still a general reference service will be highly helpful. Just at present the help of the library staff is taken only to know whether a particular reference book is available and also where it is located in the library.

12 INDUSTRIAL LABORATORY

This position is somewhat different in special laboratories and in the laboratories belonging to the Industrial concerns where adequately trained persons are appointed in order to help in reference work. This is analogous to the appointment of routine analysts, *e.g.* Micro-analysts and laboratory technicians for carrying out routine operations skilfully. Though many university laboratories have come to employ this type of analysts and technicians, the same principle is not extended to matters of library service.

2 Reference Material

Depending upon the type of information needed, a graded system of reference is in practice. For general information, there are a number of dictionaries and encyclopaedias. Very frequently, these references can lead to more detailed documents.

I could mention in this connection Thorpe's *Dictionary of applied chemistry*. This covers a very wide range of topics arranged in alphabetical order and runs into several volumes and the articles are contributed by persons who are intimate with the particular topic and also who are authorities in the subject. Edn 4 is now being published. Heilbron's *Dictionary of organic compounds* is in 3 volumes. The compounds are arranged alphabetically. Their important properties and reference to literature about them are provided. There are a number of minor dictionaries and encyclopaedias which follow the same system and may be useful for reference work. Ullman's *Enzyklopadie der technischen Chemie* (1928) running into ten volumes, and Abderhalden's *Biochemisches Handlexikon* published in 1911 in 15 volumes deserve special mention. Although these are quite old and particularly the latter one, recent issues may also be available.

21 HANDBOOK

More important than these, are handbooks which take the reader closer to the original literature and which are more or less complete in information and are also quite authoritative. In Organic Chemistry, Beilstein's *Handbook* which is in German and which runs into a large number of volumes still continues to be the standard. In spite of the publication of some volumes of Elsevier's *Encyclopaedia* in the English language the position of Beilstein as a standard reference book is still unchallenged. The method of using this handbook has to be learnt ; but it is not difficult. Besides giving information about the properties, and reactions of required compounds briefly, it gives full references to original literature. Unfortunately it is never up-to-date and one has to supplement by reference to the indexes of abstracting periodicals. For Inorganic Chemistry, Gmelin's *Hand-book* published by the German Chemical Society is the most satisfactory. In the English language Mellor's *Treatise in inorganic chemistry* and a similar one by

Newton Friend are frequently consulted. For Physico-chemical work requiring data on various properties of compounds, the tables of Llandolt-Bornstein in the German language and the *International Critical tables* in English satisfactorily cover the ground up to the years of their publication.

22 MONOGRAPH

Monographs on various limited fields are frequently published and most of them give detailed bibliography. Though they are intended to be critical discussions by experts, frequently they are mere collections containing all the matter that has been published on the subject. The monographs are too numerous to be mentioned in an article of this type. Next in importance to them come the reviews on various topics which are written by competent persons. *Chemical reviews* published by the American Chemical Society from 1924 has run through several volumes. Originally it was quarterly but now bimonthly. In Britain, quarterly reviews were started a few years back. But an earlier publication known as *Annual report on the progress of chemistry* and of *applied chemistry* have been all through giving valuable collective information on topics of interest. *Annual review of Biochemistry* deals with that branch of chemistry and related topics and has run into 22 volumes. A new series relates to recent advances in Carbohydrate Chemistry. Mention may also be made of the FIAT, BIOS and CIOS reviews relating to German Chemistry during war years. Although the information is not very reliable, they give quite a good amount of technical data. In the publication of specialised reference books on various topics, Germans have set up a high record and a large number of very satisfactory though costly books of this type have been published. From time to time Germans have published collected reports of progress on various subjects. For example, *Fortschritte der Heilstoffchemie* by Houben contains the data between the years 1877-1928, and Friedlaender's *Fortschritte der Teerfarben-fabrikation and Verwandter Industriezweige*

in 25 volumes gives similar data between 1888-1942, on this subject.

3 Abstracting Periodical

For a Chemical Investigator it is absolutely essential to go to the original source for full information. However highly efficient dictionaries and handbooks may be, this reference to original source cannot be dispensed with. For tracing original literature the abstracts form important aids. In recent years there has been a tendency for specialised societies and even industrial concerns to produce abstracts required for the particular field and send them free to scientists; for example, the Society of Public Analysts and other Analytical Chemists in Britain publish abstracts of analytical methods in their journal *Analyst*. As examples of Industrial Concerns providing abstracts may be mentioned Imperial Chemical Industries, supplying free periodical abstracts on Insecticides and Leeds and Northrup publishing similar literature on Palaeography. This certainly is a scientific and useful method of advertising their specialities and at the same time disseminating knowledge. But the abstracts internationally used and considered to be comprehensive in the chemical field are three in number.

1 *British abstracts* dealing with both pure and applied chemistry and also related biological subjects. This is published in several parts every month; the particular part with which one is interested could be bought separately.

2 *Chemical abstracts* published by the American Chemical Society come as one part and are published three times a month. They are also comprehensive and are considered to have a larger coverage than the *British abstracts*. They are divided into numerous sections though they are not sold separately. It is obviously duplication to have two abstracts of very similar nature coming in the English language. The abstracting service is naturally very costly and the Societies conducting these abstracts

have to incur very heavy expenditure ; still no way seems to have been found to merge these into one publication.

3 In the German language, the *Chemisches Centralblatt* had great standing as providing quite a comprehensive abstract literature in chemistry. But it suffered serious set-back during the War years and has not yet regained its popularity at least in the English speaking countries. As containing material of interest to the chemist may be mentioned, *Biological abstracts* started in 1926 and published in U.S.A.

4 Analysis

For a long time Analytical Chemistry was predominantly the most important branch. Even now it continues to be highly important. A number of reference books have been produced and the following can be mentioned :

- 1 Allen's *Commercial organic analysis* (1943).
- 2 Klein's *Handbuch der Pflanzen Analyse* (1933).
- 3 Scott's *Standard method of chemical analysis*.
- 4 *Physical and chemical constituents of organic compounds*.
- 5 *Dictionary of chemical solubilities*.

5 Synthesis

In recent times due to the enormous development of synthetic organic chemistry, a number of volumes containing tested methods have been published. Under this category may be mentioned the two series entitled "Organic synthesis" and "Organic reactions" published in America. Mention may also be made here of the book *Synthese der Kohlenstoff Verbindungen* by Dr. Hans Meyer, published in 1940 in 4 volumes and "Synthetic methods of organic chemistry by Theilheimer (5 Vols).

6 Avoidable Overlapping

The overlapping in abstract service by the production of two similar abstracts in the English language has already

been mentioned. The chief defect even now noticed is the time-lag in the production of the abstracts particularly from periodicals published in countries like India though they are in English. Frequently they take years for the abstracts to be made and published; serious errors too are not absent in the abstracts. The position could considerably be improved if there should be an agency in India which could collect and abstract all the papers published in this country and send them to the abstracting periodicals. I am sure this will reduce the gap between the publication of the papers and of their abstracts. But no such arrangement has come into existence so far. The National Institute of Sciences of India experimented with the production of abstracts of papers published in India. These abstracts also used to come extremely late and were soon discontinued, probably because they served no particular purpose. It may be worthwhile to revive this work in a different way, that is, to act as an agency in the preparation of abstracts and in sending them over to the well-established abstracting agencies in the various subjects.

7 Indian Periodicals

- 1 The names of periodicals published in India :
- 1 Journal of Indian Chemical Society, 1924—.
- 2 Proceedings of the Indian Academy of Sciences, 1934—.
- 3 Proceedings of National Academy of Sciences, 1935—.
- 4 Journal of Scientific and Industrial Research, 1942—.
- 5 Proceedings of Indian Institute of Sciences, 1918—.
- 6 Current science. 1932—.
- 7 Science and culture. 1935—.

All the abstracting periodicals cover the periodicals mentioned above. No Indian expert, however, is entrusted with this work. It is all done by the abstracting agencies themselves. No Indian chemical periodical has pages devoted to abstracts.

BOTANY**P. Maheshwari**

[Lists the 12 Indian media for results of research in Botany. Annotates 9 abstracting and other reference materials. Points out the need for a new edition of the *Flora of India* which is seventy years old].

1 Introduction

It seems convenient to divide this paper into four parts, one dealing with the existing botanical periodicals in India, another with abstracting periodicals, the third with some general works of reference and the fourth with some of our future requirements for facilitating botanical research in this country.

2 Indian Periodical**21 EXCLUSIVE**

Avenues for publication of botanical research in India seem at present to be quite adequate. The *Journal of the Indian Botanical Society*, started more than 30 years ago, deals with all phases of botany. The coverage of the *Indian journal of genetics and plant breeding* is as the name suggests. So is *Indian phytopathology* which deals with fungal, bacterial and virous diseases of plants. *Phytomorphology*, started three years ago, publishes articles on plant morphology, anatomy and embryology from both Indian and foreign scientists.

22 GENERAL

In addition to these there are several periodicals, sponsored by Science Academies and Associations, which publish notes or articles on all branches of science, including botany. The more important of these are :

- 1 Transactions and proceedings of the National Institute of Sciences ;
- 2 Proceedings of the Indian Science Congress ;

- 3 Proceedings of the Indian Academy of Sciences ;
- 4 Proceedings of the National Indian Academy of Sciences ;
- 5 Journal of the Bombay Natural History Society ;
- 6 Current science ;
- 7 Science and culture ; and
- 8 Everyday science.

It seems that the means of publication are adequate. What is really required is better papers and more efficient editing and printing than the production of any new periodicals.

3 Abstracting Periodical

31 LIST

While a research worker must of course consult original articles in his field wherever they may be published, it is obviously impossible for him to keep track of all or even half of this literature except through the agency of abstracting periodicals of which the more important are named below :

- 1 Biological abstracts.
- 2 Bibliography of agriculture, U.S.D.A.
- 3 Botanisches Centralblatt.
- 4 Plant breeding abstracts.
- 5 Review of applied mycology.
- 6 Fortchritte der Botanik.
- 7 Botanical review.
- 8 Biological reviews.
- 9 Annual review of plant physiology.

32 ANNOTATION

Of these the *Biological abstracts* is the most important for English-speaking countries. The arrangement is by sections and the abstracts are generally dependable for their accuracy. The chief drawback is the time-lag between the appearance of an original paper and the appearance of its abstract. This amounts to as much as two years in many cases and sometimes

even more. This often leads to duplication of research, caused by a particular scientist not being aware of the results of similar work elsewhere. It also leads to corresponding delays in the application of the results of research.

The *Bibliography of agriculture*, U.S.D.A., does not publish abstracts but only titles of papers. This is, therefore, quicker and more up-to-date and the coverage is so wide as to include even pure botany. But the entries are often wrongly classified.

From the point of view of good coverage, accuracy, and speed, perhaps the *Plant breeding abstracts* and the *Review of applied mycology* are the most satisfactory.

In addition to abstracts, there is a great need for a critical review of articles written by experts in particular fields. The *Botanical review* and *Biological reviews* are of this type. But there is room for more periodicals of a similar nature.

Valuable also are annuals such as the *Annual review of plant physiology* and progress reports and books on recent advances covering limited fields in a comprehensive but critical manner. The production of such materials on other branches of botany deserves encouragement. It is one of the urgent requirements of modern times.

4 General Reference

41 SYSTEMATIC

One of the most important works of reference to Plant Scientists is the *Natürlichen Pflanzenfamilien* brought out under the editorship of two famous German botanists, A. Engler (Berlin) and K. Prantl (Breslau), both of whom are now dead. The first edition was begun in 1887 and completed in 1909. It comprised 23 volumes of a large size. This work covers the entire plant kingdom and is world-wide in scope. It carries classification to genera and in some cases even to species. All told it is a mine of information. The only criticism that can

be made of it is lack of uniformity in the treatment of the various orders and families, caused by its composite authorship, many botanists having taken part in the preparation of the treatise.

A new edition of this work was begun and several volumes brought out. But the work was interrupted by World War II. It is doubtful if the work could now be completed by German effort alone. An entire renewing is necessary and perhaps this work should now appear in English with the cooperation of British, American and other botanists and a heavy subsidy from an organization like Unesco.

Somewhat similar, but of a different scope, is Linsbauer's *Handbuch der Pflanzenanatomie* published by Borntrager (Berlin). It was commenced soon after World War I. Several volumes have come out. Here the treatment is not systematic but comparative and synthetic. It is unfortunate that neither the old volumes are available owing to the whole stock having been destroyed during the bombing of Berlin, nor are any new ones likely to be produced, although one or two revised editions of some old volumes have appeared. The work is most valuable and deserves to be begun afresh.

42 DICTIONARY

A third requirement is the preparation of new and up-to-date dictionaries like that of Willis on the *Flowering plants and ferns*. A good attempt on *Fungi* has been made in this direction by Ainsworth and Bisby. But similar dictionaries are needed on algae, liverworts, mosses and lichens. Willis' dictionary has itself to be revised and greatly enlarged.

5 Flora of India

Hooker's comprehensive work *Flora of British India* was begun in 1872 and finished in 1897. This is a great monument to the ability and diligence of Hooker and his collaborators. This has formed the basis of all subsequent provincial and State

floras. But it is now completely out of date and needs to be entirely rewritten. Not only have many new plants been described since Hooker's days, but the names of a host of plants have been changed. The descriptions have to be revised, and more workable keys provided. Also, entirely new volumes have to be written on Cryptogams. We have practically no information on the lichens and mosses of India, for example. The proposed *Flora* should incorporate all groups of plants and give notes on their economic importance, chromosome numbers, and morphology. Possibly it should be illustrated so as to facilitate determination of difficult plants.

WHO'S WHO IN THE SYMPOSIA

1. APPATHUBA IYER (N.). *b* Travancore State. June 1903. M.A. (Madras). Cert Lib (Madras) Formerly Librarian, Training College, and Assistant Librarian, Trivandrum Public Library, Now Librarian, University Library, Trivandrum.

2. BENJAMIN (Anderson V.). *b* Naini Tal (U.P.). 23 September 1923. B.A. (Hons.). (Delhi), Dip Lib Sc (Delhi). Member, Indian Library Association. Number of papers published 1. Asst Librarian, St. Stephen's College, Delhi 1949—.

3. BHATNAGAR (A.K.). Dip Lib Sc (Delhi). Asst. Information Officer, Indian Council of World Affairs, New Delhi.

4. CHATTERJI (N.N.). *b* 19 February 1912. B.Sc. (Allahabad). Diploma in Librarianship. Diploma in French, German and Russian Languages. Travelled abroad as a Unesco Fellow in 1951. Number of papers published 5. Librarian, Indian Agricultural Research Institute, New Delhi.

5. FISCHER (Klaus). *b* Zittau i. Sachsen. 23 November 1919. Bibliotheksassessor, Universities of Leipzig, Prag, Mainz, Heidelberg. Universitätsbibliothek Mainz, Bibliothekar-Lehr-Institut Köln. Number of books published 2. Number of papers published 4. At present in Calcutta University, under Indo-German Industrial Co-operating Scheme.

6. GHOSH (Gobinda Bhushan). *b* 1 April 1921. B.Sc. (Hons.). (Calcutta), Dip Lib Sc (Calcutta), FGMS. Fellow of the Geological, Mining and Metallurgical Society of India, Member of the Library Association, Great Britain, 1949. Member of the Indian Library Association, 1948. Member, Bengal Library Association, 1951. Member of the Geological Institute, 1951. Number of papers published several. Librarian, Geological Survey of India, Calcutta.

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7. GIRJA KUMAR. *b* 30 April 1925. M.A. (Delhi). Dip Lib Sc (Delhi). Librarian, Indian Council of World Affairs, New Delhi, 1947—.

8. GOPALAKRISHNA RAO (T.). *b* 20 Dec. 1923. BA, Dip Lib Sc (Madras). Member, Madras Library Association. Member, Andhra Library Association. Member, Indian Library Association. Number of papers published about 10. Librarian, Hindu College, Guntur, 1945—.

9. GOYAL (Ram Swarup). *b* Bharatpur. 26 July 1922. BA (Hons) Dip Lib Sc (Delhi). Member, Executive Committee of Hindi Sahitya Samiti, 1945-51. Member, Executive Committee of Shri Sanatan Dharma Sabha, 1950-51. Member, Indian Library Association, 1950. Joint Editor, *Abgila* 1951. Librarian, State Public Library, Bharatpur, 1947-50. Chief Technical Asst. Delhi Public Library 1951—.

10. GULATI (Girdhari Lal). *b* Lyallpur. 5 April 1914. BA (Hons) (Punjab). Dip Lib Sc (Punjab). Member, Indian Library Association. Secretary, Indian Standards Institution Sectional Committee on Documentation. Asst Secretary, Indian Library Association, 1951. Asst Librarian, Dyal Singh Public Library, Lahore, 1936-42. Asst Librarian, C A B E Library, Government of India 1942-44. Librarian and Reference Asst, Famine Enquiry Commission, 1944-45. Senior Technical Asst, Imperial Secretariat Library, 1945-47. Number of papers published 3. Librarian, Indian Standards Institution, 1947—.

11. ISAAC (K.A.). *b* Travancore-Cochin. 10 July 1926. B Sc (Travancore) Dip Lib Sc (Delhi), Student, Master of Library Science (Delhi). Member, Indian Library Association. Number of papers published 4. Librarian, Nirmala College, Delhi.

12. JAYARAM (E.D.). *b* Madras. 7 November 1910. B A (Madras), B L (Madras). Secretary, Junior Historical

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Association, Presidency College, Madras, 1928-29. Secretary, Tamil Sangam, Law College, Madras, 1937-38. Advocate, High Court, Madras, 1940-42. Legal Asst, Ministry of Law, 1942-50. Number of papers published 30. Librarian, Ministry of Law, 1950—.

13. KAULA (P.N.), *b* Srinagar. 13 March 1924. B A (Punjab), Dip Lib Sc (Banaras), B Lib Sc (Delhi). Member of the Council, Indian Library Association, 1949. Managing Editor, *Abgila*, 1951—. Rapporteur, International Bibliographical Survey, 1949-51. Visiting Lecturer, Dept of Library Science, Aligarh University 1951—. Secretary, Ranganathan Endowment for Library Science, 1952—. Managing Editor, *Sharda* 1952—. Member, Government of India Libraries Association. Librarian, D A V College, Srinagar, 1944-47. Librarian, Birla Central Library, Pilani, 1947-48. Technical Asst, Delhi University Library, 1948-50. Librarian, Delhi College, 1950-51. Number of books published 4. Number of papers published 140. Librarian, Ministry of Labour, 1951—.

14. KOLHATKAR (Vasudeo Purushottam). *b* Poona. 20 June 1911. B A (Bombay) B T (Bombay), Dip Lib (Madras). Secretary, Poona Library Association upto 1951. In-Charge, Summer Course in Librarianship, Poona, 1948-50. Member, Governing Council, Maharashtra Library Association. Member of the Council, Indian Library Association. Librarian, N M V High School, Poona, 1943-46. Librarian, Marathi Grantha Sangrahalaya, Bombay, 1946-47. Number of books published 4. Numbers of papers published 15. Librarian, Maharashtra Regional Library, Poona 1949—.

15. KORANNE (Trimbak Narayan). *b* Gwalior. 24 July 1922. B Sc (Agra), B Lib Sc (Delhi). Member, Indian Librarian Association. Junior Technical Asst, Delhi University Library, 1949-52. Participant from India in the Australian Library, Seminar 1952. Number of books published 1.

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Number of papers published 7. Senior Technical Asstt, Delhi University Library, 1952—.

16. KRISHNA IYENGAR (Jois Narasimha). *b* Mysore. 25 September 1905. M A (Mysore), Vidwan in Jyautish (Mysore). Student, Diploma in Library Science (Delhi). Member, Indian Library Association. Librarian, Government Oriental Library, Mysore, 1933-40. Library Asst, University Library, Mysore, 1940-45 and 1946-47. Librarian, Maharaja's College, Mysore 1945-46. Honorary Secretary, Public Library, Mysore City, 1944-51. Part-time Lecturer in French, University of Mysore, 1949-52. Number of papers published 1. Asst Librarian, University Library, Mysore 1947—.

17. KRISHNAMURTI (Chidambaram Shivaramakrishna). *b* Chidambaram. 1 September 1913. B A, M Litt (Annamalai), Dip Lib Sc (Madras). Member, Documentation Committee, Indian Standards Institution. Asst, Annamalai University Library, 1934-43. Librarian, Office of the Economic Adviser, Ministry of Commerce, 1943-44. Librarian, Central Board of Revenue, 1945—.

18. KRISHNAN (R.S.). D Sc. Professor of Physics, Indian Institute of Science, Bangalore.

19. KRISHNA RAO (D.B.). *b* Dharapuram. 7 June 1915. M A, M Sc, Dip Lib Sc (Madras). Research Student in Library Science, University of Delhi. Librarian, Agricultural Research Institute, Coimbatore, 1941-50. Participant from India in the Australian Library Seminar, 1952. Member, Indian Library Association. Number of papers published 12. Librarian, Indian Council of Agricultural Research, New Delhi, 1950—.

20. MAHESHWARI (Panchanan). D Sc (Allahabad). Fellow of the Indian Academy of Sciences, 1934—. Fellow of the National Institute of Sciences, 1935—. President, Indian Botanical Society, 1952. President, Botany Section, Indian

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Science Congress, 1951. Vice-President, Plant Morphology Section, International Botany Congress, 1950. Chairman, International Committee on Plant Embryology, 1950—. Editor, *Phytomorphology* 1951—. Corresponding Member, Indian Botanical Society, 1949—. Honorary Foreign Fellow, American Academy of Arts and Science, 1949—. Head of the Department of Botany, University of Dacca until 1949. Number of books published 1. Number of papers published about 100. Professor and Head of the Botany Department, University of Delhi, 1949—.

21. **MOGHE** (Vasudeo Shivaram). *b* Indore. 8 April 1913. B A (Agra), Dip Lib Sc (Delhi), Student, Master of Library Science (Delhi). Member of the Council, Indian Library Association. Number of papers published 1. Development Inspector, Madhya Bharat Government.

22. **NARSINGA RAO** (Ambur). *b* Kumbhakonam. 8 December 1933. B A (Hons) L T. D Sc (Madras). Collaborateur, *Revue Semestrielle des Mathematicians*, Amsterdam. Fellow of the Indian Academy of Sciences. Joint Editor, *Journal of the Indian Mathematical Society*. Editor, *Mathematics Student*. President, Indian Mathematical Society, 1949-51. Associate Fellow, Indian Aeronautical Society. Fellow, Indian Aeronautical Society 1953. Member of the Senate, Annamalai University, 1929-46. Member of the Senate, Andhra University, 1946-50. Member of the Syndicate, Annamalai University, 1929-32. Lecturer, Madras Christian College, 1916-21. Lecturer, Presidency College, Madras, Engineering College, Guindy etc., 1921-29. Professor of Mathematics, Annamalai University, 1929-46. Gandhian Professor of Mathematical Physics, Andhra University, 1946-50. Number of papers published about 35. Professor, Madras Institute of Technology, 1950—.

23. **NARAYANAN** (P.S.). Department of Physics, Indian Institute of Science, Bangalore.

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24. NEELAMEGHAM (A.). *b* Ootacamund. 3 July 1926. B Sc, Dip Lib (Madras). Member, Madras Library Association, 1950—. Member, Indian Library Association Corresponding Member, Library Association, London, 1950—. Librarian, Pasteur Institute, Coonoor, 1948-49. Asst Librarian, Osmania University, 1950-51. Librarian, Vivekananda College, Madras, 1950-51. Number of papers published 4. Librarian, Madras Medical College, 1951—.

25. PARTHASARATHY (K.S.). *b* Tanjore. 22 August 1905. M A (Madras) Cert Lib (Madras). Passed the Associateship examination of Library Association, London. Member, Library Association, 1934. Associate of the Library Association, London, 1937-40. Asst and later Librarian, Andhra University, 1932-40. Librarian of the Inspectorate of Military Explosives, Kirkee. 1942-48. Research and Reference Asst, D G R & E, Ministry of Labour 1948-49. Number of papers published 2. Asst Librarian, Indian Council of Agricultural Research, New Delhi, 1949—.

26. PARTHASARATHY (Seringapatam). *b* Pondicherry. 23 August 1917. B A, Dip Lib Sc (Madras). Member, Indian Library Association, Member, Madras Library Association. Member, I S I Documentation Committee. Librarian, Hindu High School, Madras. 1941-44. Asst Librarian, Inspectorate of Military Explosives, Kirkee, 1944-46. Senior Technical Asst, Delhi University Library, 1946-52. Number of papers published several. Junior Documentation Officer, Indoc 1952—, and part-time Lecturer, Department of Library Science, University of Delhi, 1951—.

27. PURANIK (Krishnaji Dattatraya). *b* Pali. 20 August 1922. M A (Bombay) M Lib Sc (Delhi). Member, Indian Library Association. Number of papers published 8. Librarian, Ratan Tata Library, Delhi School of Economics, 1951—.

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28. RAMABHADHAN (S.) *b* 5 April 1909. B A, Cer Lib Sc (Madras). Dip Lib Sc (Delhi). Student, Master of Library Science (Delhi). Member, Madras Library Association, 1936—. Member, Indian Library Association. Asst Secretary, Indian Library Association, 1950-51. Treasurer, Indian Library Association, 1951—. Member, I S I Documentation Sectional Committee, 1950—. Reference Asst, Madras University Library, 1934-45. Technical Asst, Delhi University Library, 1945-49. Number of papers published several. Asst Librarian, Delhi University Library, 1949—.

29. RANGANATHAN (Shiyali Ramamrita) *b* Shiyali. 12 August 1892. M A (Madras). D Litt (Delhi). L T (Madras), F L A, Honours Certificate, School of Librarianship, University of London. Fellow, British Library Association. Secretary, Madras Library Association. President, Indian Library Association. General Secretary, Indian Adult Education Association. Member, Government of India Social Education Committee and Delhi Adult Education Committee. Librarian, Madras University Library, 1924-45. Librarian and Professor of Library Science, Banaras Hindu University, August 1945-June 1947. Teacher of Library Science, University of Delhi, 1947—. Faculty Member, Unesco International Library School, 1948. Member, International Committee of Library Experts, United Nations, 1948. Member, National Library Committee (Calcutta), 1933-36; 1948-51. Member, Unesco's International Committee of Bibliographical Experts, 1951—. Number of books published 38. Number of papers published about 800.

30. SESHADRI (T.R.). *b* 3 February 1900. M A, Ph D (Manchester), F R I C, F A Sc, F N I. Formerly Soil Chemist, Agricultural Research Institute, Coimbatore, Reader and later Professor of Chemistry, Andhra University. Number of books published 1. Number of papers published 345. Professor of Chemistry, University of Delhi.

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31. SHARMA (Hari Dev). *b* Jullundur. 17 April 1928. M A (Punjab). Dip Lib Sc (Delhi). Librarian, Asian Trade Union College, Calcutta.

32. SIVARAMAN (K.M.). *b* Kesarimangalam. 17 September 1903. B A (Madras). Member, Madras Library Association. Asst Secretary, Madras Library Association, 1945—. Member, Exhibition and Publicity Committee, All-India Educational Conference, 1945. Member, Central, Educational Week, 1945—. Member, Expert Committee on Paper and Print, Tamil Encyclopaedia, 1949—. Member, Child Book Week Exhibition Committee, 1949. Member, Kambhar Mazaham, 1949. Member, South India Adult Education Week Committee, 1951. Member, State Library Committee, Madras 1950—. Convener, Exhibition Committee of the Tamil Nad Library Convention, 1951. Member, Tamil Writers' Association 1952—. Head of the Technical Section, University Library Madras 1926-45. Part-time Lecturer in Madras University, 1931-38 and 1945. Number of books published 4. Number of papers published 38. Cataloguer and Tamil Editor, Oxford University Press, Madras, 1945—.

23. SOBI SINGH. *b* Moradabad. 1 July 1917. B A, Dip Lib Sc (Delhi). A V T C (Uttar Pradesh). Member, Indian Library Association. Teacher, Parker High School, Moradabad, 1940-43. Accounts Clerk, R A F 1943-46. Teacher, Harcourt Butler Higher Secondary School, New Delhi, 1946-51. Library Asst, Indian Standards Institution, 1951—.

34. UJALAMBAKAR (K.M.). *b* Ujalamba. 15 December 1924. M A, LL B (Hyderabad). Dip Lib Sc (Delhi). Student, Master of Library Science (Delhi). Member, Indian Library Association. Honorary Secretary, Hyderabad Library Association. Librarian, Nizam College, Hyderabad.

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35. VENKATASUBRAMANIAN (V.S.). Department of Physics, Indian Institute of Science, Bangalore.

36. VICKERY (Brian Campbell). *b* Sydney. 11 September 1918. M A (Oxford). Honorary Membership Secretary, Reference and Special Libraries Section, Library Association, 1952—. Member, Committee, Reference and Special Libraries Section, Library Association, South Eastern Group, 1951—. Information Officer, Ministry of Supply, Royal Ordnance Factory, Bridgwater, Somerset, 1943-45. Number of papers published 15. Librarian, Imperial Chemical Industries Limited, Butterwick Research Laboratories, Welwyn, Herts, 1946—.

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